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CHARLES E. KELLOGG

I N D I A J O U R N A L

(Also including notes for stops in Iran,

Thailand, Viet Nam, Hong Kong, Japan, and Hawaii.)

CHARLES E. KELLOGG

Volume I

January 15 through February 26

1959

PREFACE

This Journal covers mainly work in India but includes also stops in other places, especially Viet Nam, Japan, and Hawaii. The full report of the Mission is not included within this Journal.

An Appendix volume for this India Journal contains papers of special relevance to the text of the Journal. Some of these are referred to at the bottoms of the pages of the text by Roman numerals corresponding to the table of contents of the Appendix volume. Thus a note at the bottom of the page, such as Ap. I, means that one or more supporting documents are in that section of the Appendix volume.

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INTRODUCTION

Sometime in early October, and before I had completed the diaries and reports of the Mission to the Soviet Union I headed in July and August, Dr. Douglas Ensminger called to invite me to go for three months with a team to India being sponsored by the Ford Foundation. I explained that I had been to Asia twice already in 1958. He insisted. Finally I said I would go if Assistant Secretary E. L. Peterson asked me to go and if arrangements could be made for Mrs. Kellogg to go to give the treatments for my arthritic back and do my secretarial work. Mr. Peterson asked me to go because of the great importance the Government of the United States attaches to economic progress in India. And it was arranged for Mrs. Kellogg to go also as an agent of the Ford Foundation.

The object of this Ford Team is to study the existing agriculture and make recommendations to the Government of India for an immediate or "crash" program of increased food production - so important to the economic, social, and political stability of that country and of southern Asia.

As arrangements were being made, I planned a 2½-day stopover in Rome with Dr. Ignatieff and, at the request of Mr. John Oliver, a 2-day stopover in Teheran with Mr. Leo L. Anderson and Mr. Tom A. Mead of the Khuzestan Development Service of the Development and Resources Corporation of New York City.

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Dr. E. M. Cralley, University of Arkansas

Mr. Gerald Huffman, Extension Service,
U. S. Department of Agriculture

Dr. A. A. Johnson, Cornell University

Dr. Sherman E. Johnson, Agricultural Research Service,
U. S. Department of Agriculture

Dr. O. J. Kelley, Agricultural Research Service,
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Dr. Harold Miles, Farm Credit Administration

Mr. Frank Naegely, G. L. F., Ithaca, New York

Dean A. D. Weber, Kansas State College

Dr. Norman Wengert, University of Maryland

Following the work in India, a stopover in Saigon, Viet Nam was tentatively suggested by the Rockefeller Foundation. It was planned also that I should examine the work of the Soil Conservation Service in Hawaii on the way across the Pacific.

The notes included in this India Journal were taken on the spot, often in great haste. Many conclusions and suggestions are, or may be, modified with more study and reflection. Readers are not to quote any parts without permission in writing.

Many books, reports, and bulletins were also gathered. Both color transparencies and black-and-white photographs are on file.

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U.S. DEPARTMENT OF AGRICULTURE

January 15

Mrs. William Bowie had volunteered to take us to the railway station. She comes early so we leave home about 10:30 and get to the station at 11:00 a.m. We have a leisurely lunch and board the train, which leaves for New York at 12:35 p.m.

The only consolation for starting another long, hard trip to Asia, after two of them in 1958, is that my wife goes with me. Yet it has been a big job making all of the arrangements for leaving our home unoccupied for nearly four months.

We arrive in New York at 4:55 p.m. and go to the New Weston Hotel. After a little walk we have dinner and are early to bed.

January 16

This is a rainy morning. About 9:30 we call at the Ford Foundation and discuss our plans with Mr. Atwater and Miss Dallas. Everything seems to be in order. We discuss a draft letter for them to sign about my wife's travel and then we go to call on Dr. A. H. Moseman of the Rockefeller Foundation at Rockefeller Center. He plans to leave for India tomorrow night and will arrive in Delhi before us. Dr. Moseman speaks very highly of Mr. A. N. Jha who apparently will be the leader of the Indian counterparts of our team. (Added Later: He was not.) He says, too, that Dr. K. Ramiah is very knowledgeable about rice and is just completing a comprehensive report on the rice problems in India.

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Dr. Moseman calls in Dr. Chandler and I try to find out something about a situation in Viet Nam. (Day before yesterday Dr. Alexander had called me and said that he understood that Dr. Bradfield was sending me a letter to New Delhi suggesting that I stop in Saigon on the way back to uphold the local soil scientist, Dr. Moormann, sponsored by FAO, with the Minister of Agriculture that some of the swampy cat clays cannot be successfully drained.) Neither Moseman nor Chandler know about this but indicate that arrangements could be made to take care of my expenses if I made the stop-over in Saigon.

Then we go back to the Ford Foundation offices for luncheon with a few members of the staff and some of the others going to India on this mission - Dr. Weber, Dr. and Mrs. Miles, and Dr. Cralley.

We return to the hotel, check out, and go to the East Side Air Station. Even with full pockets we check in with about 2 kilos overweight (but without charge). We leave at 6:30. This takes us directly to the hangar for the new Pan Am jet. The weather is bad and they do not like to leave it sitting in the open for fear of icing. We are in the air at 7:55 p.m. The seats are comfortable and the plane goes very smoothly. We are down at Gander about 9:03 and up again at 9:46. (Added later: The stop in Gander is required because Pan Am is not allowed to use the long runway and cannot take a full load of fuel.)

I see no possibility of sleep. I chat with some of the passengers in the lounge and alternate between tea and bananas. Thus one day passes to another.

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We come over Paris a bit behind schedule but it is too foggy to land. Instead of going on to Rome they go back northwest and land at London at 9:25 London time.

We are herded into a cold, drafty airport salon and left without any information for a long time. While waiting in the airport we have a pleasant chat with Lord and Lady Orr who are on their way to Israel. We get a rather poor British breakfast and then go back into the plane. The wheels are up for Paris at 12:22 p.m. and down in Paris at 2:03 p.m. (Paris time) about 5 hours late.

We are told that we will be here only about 20 minutes but the crew dallies about and in about 40 minutes a fog begins to accumulate. For some reason they continue to wait, possibly to be sure they will get overtime pay, I don't know. So we wait for a long time without any information and are then given dinner. After dinner they tell us we will go at 9:00 that evening and at 5:00 we are taken to a bus. Our hand luggage and other baggage has been taken off the plane. We sort it out and get into the bus where we sit until 5:45. The bus takes us then to the Ambassador Hotel in Paris. This is a long ride and we get there at 6:30. We wait some more and finally get a room. We take a nap. I start to dress about 8:30 to go back to the airport but now we are told that the plane will go at 9:30 in the morning. So back to bed.

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During the night I become ill, I think from the breakfast sausage in London, and fall back on my old stand-by of paregoric and kaolin. We go downstairs to get the bus to the airport but discover that we don't rate for some reason and that we shall need to wait for a later plane leaving at 1:30. I try some breakfast but it doesn't go well.

The Pan Am controls and ground crews could not possibly have handled things much worse. In the first place they should have gone on to Rome where most people wanted to go instead of London where nobody wanted to go. When they did return to Paris the field was clear for more than 30 minutes; but they simply puttered around until the fog became worse. Then during the dinner the fog lifted long enough but they continued to wait. (From rumors I heard later, I think they could have gone to Rome but felt they would make more money by leaving us in Paris and making the trip back to New York on schedule!)

I call Professor Georges Aubert about 10:30. He comes to the hotel and we have a little chat. I try to eat some lunch but it is useless. I go to my room and rest a bit. We finally get into the bus a little before 2:00 p.m. and go to Le Bourget airport. It is a cool, wet day.

The wheels are off the ground for Rome at 3:06 and down again at Rome at 6:12 p.m. We are met by Dr. and Mrs. Ignatieff. We go through customs and out to their home. Although I don't feel well we talk for some time and are late to bed.

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After breakfast we go over to FAO. I talk briefly with Luis Bramao, John Blackmore, Rainier Schickle, and others. I have a long conference with Director General Sen and two of his assistants about the food problem in India with special reference to possibilities of better storage facilities, more rolling stock, and price supports. We also speak of agricultural credit, especially small supervised loans, and the importance of clearing up the question of any limitation of acreage. I don't believe that Sen himself has realized before that these proposed limitations to something like 30 standard acres would result in permanent agricultural poverty in India (at least permanent before a certain revolution.) I point out to him that one can use the method of expropriation of badly used land as a much better way to insure complete and adequate use of the agricultural resources. Apparently he is going to have to chew on this awhile.

I return to Ignatieff's apartment for a late lunch. This turns out to upset my stomach again so I spend an unpleasant afternoon mostly lying down. We talk a bit more about the work in Iran and Bramao comes over for a visit.

During the evening I continue with the paregoric and kaolin, and charcoal tablets. About midnight the Ignatieffs take us to the airport and one day passes to another.

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This is a comfortable plane. To my amazement I fall asleep until 5:45. I have a little breakfast. Most of the time we are over clouds and our pilot has a little trouble in getting the plane down at Beirut because of the combination of clouds and air currents. We are down at 8:02 Rome time, which is 9:02 Beirut time.

One is amused at the bureaucratic treatment of the passengers here. Some of the men that stamp the cards are obviously performing no useful function.

We are soon back in the plane and the wheels leave the ground at 9:43. I feel a little better but very weak and very tired. It is cloudy most of the way to Teheran but just before landing we get a fair view of the mountains and of the unique ghanats.

We are down in Teheran at 1:30 Beirut time, which is 3:00 p.m. Teheran time. Iranian employees of the KDS (Khuzestan Development Service) meet us at the plane and help us through the formalities. We are met in the airport by Mrs. Leo L. Anderson, Miss Joan Aamodt, and Mr. Tom A. Mead. We are driven immediately to the Park Hotel. After a few pleasant, but hurried, words I go to bed. We awaken for dinner in our room about 9:30 and then back to bed.

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It rained nearly all last night and early this morning there are big flakes of snow. I suppose this is a typical Mediterranean winter rainy spell, certainly in striking contrast to the summer. Although I am not ready to start climbing mountains, I feel very much better this morning.

We have breakfast in our room and then about 9:00 I am off to the KDS office with Anderson and Mead. Here I also meet Mr. Crosby whom I suppose to be the administrative officer.

As I understand it FAO first started to supply experts in soils with the Irrigation Bangah, which is a part of the Ministry of Agriculture although it operates with considerable independence. Actually there are survey projects in several parts of Iran. Four or five surveys have been undertaken in the Khuzestan area. Each of these had a unique legend and apparently there was little attempt to coordinate them on the assumption that each FAO "expert" was above direction. It is of course essential that the KDS have accurate soil surveys on a uniform basis for planning the extensive development works resulting from the new dam and increased water supplies. This work will involve irrigation of soils previously not irrigated and the reworking of old systems together with drainage. Fertilizers will be necessary for efficient production, especially of the planned program for sugarcane development.

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Ap. I

In order to get a general idea of fertilizer responses many hundreds of test plots with two levels of nitrogen and two levels of phosphorus, in various combinations, have been laid out on cultivators' fields with all sorts of crops but especially wheat. Of course not all of these can have measured yields, nor need to have. Besides getting ideas necessary for laying out longer time experiments with good statistical controls, this work has enormous educational value. The education program is very important since one plant for urea and one for ammonium nitrate will be in production in a year or two.

As the work developed it became obvious that the Irrigation Bangah was not equipped mentally or otherwise to do the whole job needed including soil surveys, fertilizer research and testing, soil analyses, etc. The administration is poor. For example, they send out the Iranian trainees for three months, then recall them, and send out new ones. Thus actually the training program goes very badly. If this were put under the Ministry of Agriculture, the same bureaucratic problems would continue. Further, the Ministry is financed primarily by the taxes that few people pay. The great source of funds from the oil revenues is available to the Plan Organization.

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Following this general discussion, we go out to the new soil laboratory at the edge of the city. KDS has been anxious to help develop the staff in this laboratory and has already furnished funds for two positions. But salaries are low and most of the men work short hours because they must work at some other job also to make a living. So far it has not been possible to correct this situation and much against their desire KDS may need to establish a field laboratory under its own management in Khuzestan.

I go briefly through the laboratories where the usual determinations are being made on soils and irrigation waters. For mechanical analysis they are using the hydrometer method without adequate controls for temperature, which compounds the errors of the method. Since the soils are highly calcareous, they are using Olsen's method for available phosphorus but without too good results, they believe because of the great ranges of the air temperature in the laboratory. I then go to the soil survey rooms and talk with M. L. Dewan, J. S. Veenenbos, J. W. Dewis, O. A. Makitie, and A. J. Bakker about the soil survey work. I can see that each FAO "expert" has been working individually as he thinks best without any real party leader. For the Khuzestan Dr. Veenenbos has put together a compiled map at 1:50,000 from three independent jobs.

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We now discuss the possible strategy in my future discussions with the leaders of Plan Organization about the nature and position of the Soil Survey program and other soil work in the government. I emphasize the importance of not assuming that the Ministry of Agriculture is the only logical place. I point out the arrangements in New Zealand and Belgium.

Frankly I get a rather poor impression of the FAO organization here. Obviously there is no real scheduling - in short no real administration. Then it comes out, too, that the boys hardly know whom to write to at Rome. Their letters get shifted about and orders for simple materials are delayed weeks or even months. It is clear to me that all of these boys are spending too much time in Teheran. They have no adequate accounting and if they did I am sure the cost per hectare would be unreasonably high.

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Then Mr. Anderson and I go for a late lunch and have a long talk about this program here. He certainly has a great many irons in the fire. Obviously he is trying very hard, perhaps a trifle too hard; but I think he is going about things in the right way so far as I can tell. I wish now that I could have been here for a week or two with Dr. Ignatieff. I feel sure that many of these difficulties could have been resolved.

In the evening we have dinner with Mr. and Mrs. Anderson chez Mead. Miss Joan Aamodt joins us. They have a very nice house and have with them many of the things brought from Africa.

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January 22

Mr. Anderson and I have breakfast about 7:30 and then go to the KDS office. Mead and Crosby join us and we go to Plan Organization for a meeting with Mr. Safi Asfia. He is a small man, somewhat retiring and very soft voiced. There is also in the room an assistant, Mr. Mozayeny, who serves as liaison with KDS.

I give a general explanation of the purpose of a basic soil survey and how the same soil survey is interpreted for various phases of agricultural planning, forestry, range development, and civil engineering. I emphasize the importance of national standards so that the engineers and advisory officers do not have to learn several systems of notation.

Mr. Asfia asks reasonable questions and seems to accept without difficulty the suggestion for a National Soil Institute in Plan Organization without specific commitment as to its future location in the government. I urge that he not worry about that now. When the time comes it may be wise to place it in the Ministry of Agriculture or, possibly, in a future Ministry for Scientific Research along with geological surveys and the like. I point out however, that if this is done a very good advisory board will be needed representing the various using groups to avoid the possibility of the Institute becoming academic and neglecting the practical interpretations.

My associates seem to be very pleased with the conference.

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In the evening we go to a very nice dinner party at the Mead's who are joint hosts with the Andersons.

Finally to bed at 11:45. It still rains.

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January 23

I am up a bit before 7:00. It is cold this morning with snow on the trees and roofs. Although heavily overcast I go down at 7:30 and try to make photos of the hotel and garden. (K-2661) We then go in to breakfast with Mr. Leo Anderson and afterward complete our packing. BOAC calls to say that the plane from Beirut may not land in Teheran because of bad weather. We work on the notes for a while. Then the Andersons come up and we find that BOAC now expects the plane to land a bit late. Our baggage is taken down to the cars where we also meet Mr. Mead and his daughter Cathy. Since we have some time, we drive out toward the mountains through a nice residential section up to the summer residence of the Shah. The snow has changed to rain. Then we go on to the airport about 11:30 a.m. and check im. We still have time for tea. We say our good-byes and go through customs about 12:30 p.m. and wait. At 1:00 we board the plane and are in the air at 1:15. The air is still cloudy.

After a very slow lunch we work on the notes for Teheran until it is time to leave the plane in Karachi at 6:30 local time, or 5:00 p.m. Teheran time.

We meet Dr. Anderson of our Ford Foundation team on this plane and, in the airport, Mr. and Mrs. Gibson who had come down to see Dr. Anderson, an old friend. We spend about one and a half hours in this noisy place and are in the air at 8:05, which is 8:35 Delhi time. Then we have another meal which takes up most of the time.

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K-2661. Teheran, January 23, 1959.
Park Hotel in early morning
after snow.

K-2661. Tehran, January 23, 1959.
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We are down at the Delhi airport at 10:45 p.m. Mr. Iyer of the Ford Foundation takes our passports and helps us through the formalities. Fortunately, I worry about my baggage and discover in time that one piece had been left behind within the airport. Dr. and Mrs. Ensminger meet us with leis and Mrs. Parker and Miss Clouse are also there to greet us.

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PAKISTAN
MULTAN
Bahawalpur
Khanpur
SHIKARPUR
Indus
Thar Desert
BIKANER
Jaisalmer
Nawabshah
Barmer
Jodhpur
Palam
DELHI
Jumna
Saharanpur
MEERUT
MORADABAD
BAREILLY
Aligarh
Ganges
JAIPUR
AGRA
AJMER
Sawai
Chambal
Pali
Aravalli Hills
Luni
Kotah
Jhansi
Bamhrauli
ALLAHABAD
Amansi
LUCKNOW
KANPUR
Fyzabad
Gorakhpur
Gogra
Kosi
Dhaulagiri
8172
Annapura
8078
Tsan-Po
Mount Everest
8882
KHATMANDU
Bhatgaon
PATAN
NEPAL
Darjeeling
BHU
Darbhanga
PATNA
BANARAS
Gaya
Airport
Bhagalpur
Gaibandha
Jamalpur
PAKIST
KARACHI
Palanpur
Udaipur
Etawah
Murwara
Kutch
Bhopal
JABALPUR
Ratlam
Airport
Maikal Range
Gulf of Kutch
AHMEDABAD
BARODA
INDORE
Itarsi
Narbada
Khandwa
Satpura Range
Mananagar
Bhavnagar
SURAT
Tapti
NAGPUR
Bilaspur
Raipur
Chandernagore
Barrackpore
Dum-Dum
Kharsawan
HOWRAH
Midnapur
CALCUTTA
Mouths of the
Brahmani
Mahanadi
Veraval
Diu
Gulf of Cambay
Daman
Bhusawal
Wardha
Deccan Plateau
Manmad
INDIA
Puri
Santa Cruz
Kalyan
BOMBAY
Godavari
Nander
Bel Dila
Berhampur
Parvatipuram
ARABIAN
POONA
Hanamkonda
Vijayanagaram
Dhond
Brima
Secunderabad
Godavari
Rajahmundry
Miraj
HYDERABAD
Vijayawada
Yanaon
BAY
Muddebehal
Western Ghats
Kistna
GOA
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Penner
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SEA
OF
BENGAL
BANGALORE
MADRAS
Nilgiri Hills
MYSORE
Pondichery
SALEM
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Cauvery
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0 100 200 300 400 500 600 700 800 km.
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Palamcottah
Palk Strait
Medawachiya
9 Degree Channel
Trivandrum
CEYLON

AN UP TO DATE AIR FLEET, PERFECTLY SUITED TO THE LINES IT SERVES

The latest product of the Lockheed Aircraft Corporation, the Super Starliner, is powered by a highly perfected version of the classic piston engine.

Intended for long intercontinental flights, Super Starliners are used on Air France lines between Europe and the Americas and between Europe and the Far East. Super Starliners serve the Polar lines between Paris and Tokio. Their extraordinary flight range of 6,000 miles makes it possible to serve this 8,000 - mile line with a single technical stop at Anchorage, Alaska — on a regular basis. The Super Starliners are the only planes now in operation which can do so.

Super Starliners carry from 48 to 91 passengers, depending on the accommodation provided, at more than 373 miles per hour.

Super Starliners serve the most luxurious flight in the world —the Golden Parisian flight between Paris and New York. A Super Starliner holds the record for the most extraordinary commercial flight ever made—the non-stop flight from Los Angeles to Paris (6,000 mi.) in 16 hours and 23 mins. with 40 passengers on board.

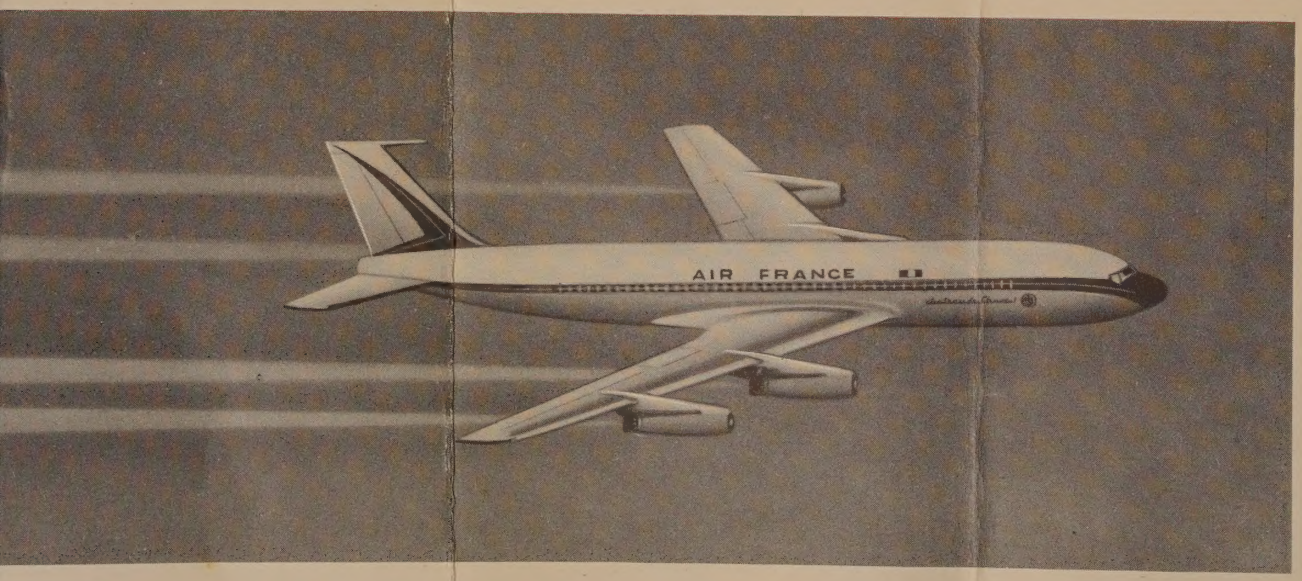
The predecessors of the Super Starliners —the Super G Constellations and Constellations —also serve Air France's international lines. Built on similar plans, with standard performance records, they provide excellent and speedy flights on shorter routes.

The Caravelle is the world's first medium-distance twin-jet plane; it was developed and built in France. Its prototype has been greeted with enthusiasm by aviation engineers and the technical press during the course of its numerous trial flights.

From the layman's point of view, the essential characteristic of the new plane is the unusual position of the jets which are placed on either side of the fuselage, rear of the cabin, near the plane's tail.

This new layout presents some outstanding advantages. The wings, freed of cumbersome engines, are completely aerodynamic. The fuel, located in the wing-tanks, is far removed from the engines, thus obviating risk of fire. The jets themselves, placed behind the cabin, cannot be heard by the passengers. This wonderful new experience of silence and complete relaxation is one of the greatest pleasures mentioned by the first privileged passengers of the new plane. Another advantage which has been particularly appreciated is the total absence of vibration.

The Caravelle carries from 70 to 80 passengers at 480 m.p.h. over distances ranging from 930 to 1,860 miles. They fly at an altitude of 36,000 feet and their triangular portholes with wide bases give passengers an extraordinary view of the world across a sky which is always blue.



From the end of 1959 onwards, the Bœing 707 Intercontinentals will replace Super Starliners on major Air France intercontinental routes... thus bringing passengers the enormous advantages of jet age travel.

These planes put Paris within 6½ hours of New York, 10 hours of Rio de Janeiro and 18 hours of Tokio. With a flying speed of 621 m.p.h., they will transport from 124 to 189 passengers in even greater comfort than in planes now in use. Enormous fuel reservoirs give the new planes a flight range of more than 7,450 miles.

The prototypes are now being given trial flights, under conditions deliberately contrived to be difficult. They have already been tried out in extremes of latitude, weather and other criteria over thousands of miles.

Thanks to the Bœings and Caravelles, Air France will be the first company in the world to offer its passengers the advantages and pleasures of jet age travel on both medium and long-distance flights — and this from 1959 onwards. This exceptional achievement is one more proof of Air France's outstanding position in world-wide commercial aviation. It justifies the confidence of the three million passengers it transports over the entire world every year.

January 24

We are up a little after 7:00 for tea. We unpack and go to breakfast where we meet several of the others on this agricultural mission. Dr. Parker comes in and we have a brief talk.

I spend most of the day in my room in order to clean up the Teheran visit, mainly in the form of a long letter to Dr. Ignatieff.

I finish this about 6:00 p.m. and mail it. Dr. Parker brings the baker for my back, ordered in advance. I look up the hotel electrician in order to get a proper extension plug for it.

About 7:30 Dr. Parker comes for us and we go to his home for dinner along with Dr. and Mrs. Sherman Johnson, Dean Weber, Dr. Omer Kelley, and Dr. Moseman. After a very pleasant evening he brings us back to the hotel and I am to bed at 11:15 p.m.

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'Rabi' Campaign Fails To Enthuse Farmers

SOME EVEN SCEPTICAL OF GOVT CAPACITY TO HELP THEM

By A Staff Reporter

'WHAT is this rabi campaign you are talking about?" a villager in Kanjiwala development block of the Union Territory asked this reporter on Tuesday when he went to assess the progress of the campaign.

The hardy peasant, within a stone's throw of the red-stone walls of the offices of the Ministry of Agriculture, had not even heard of the campaign which we were given to understand had caught the imgaination of the farmers. The campaign had even set a target for increased yield!

The fact that emerged at the end of this reporter's three-hour drive through some villages in the Union Territory was that the rabi campaign has achieved precious little. The much publicised improved seeds did not reach every farmer and, worse still, the lack of a basic requirement like irrigation water was, perhaps, never even thought of by the powers-that-be.

However, the blame here does not entirely rest with administration. I was given to understand that the idea of launching the campaign occurred or at least was given currency hardly four weeks before the sowing was due to begin in the middle of November. And then not sufficient stocks of improved seeds were made available to the local authorities. During these four weeks the authorities were expected to assess the requirements of the farmers and also to make arrangements for distribution of seeds, etc.

IRRIGATION FACILITIES

The result has been that during the few weeks of preparation nothing much was achieved. The irrigation facilities were hardly increased. The irrigation requirements could be met by digging more canals to draw water from the Punjab which the authorities have not done. The alternative lay in sinking tubewells Here the authorities have taken nearly three years before starting exploratory work.

So far as the distribution of improved seeds is concerned, even granting that sufficient stocks were not made available, how would the authorities answer a Narela villager's allegation who said that "they gave the seeds to a selected few." According to him no effort was made to reach the maximum number of farmers.

In view of this the villagers do not take the campaign seriously. In fact they doubt the authorities' capacity to help them. They treat this talk of a campaign being on in the Union Territory as a "big tamasha, with jeeps coming and going." During the campaign, which ends some time in March, teams of workers were expected to go round the village until the harvest time. But not many teams have visited the villages. At least that is what most of the villagers told this reporter.

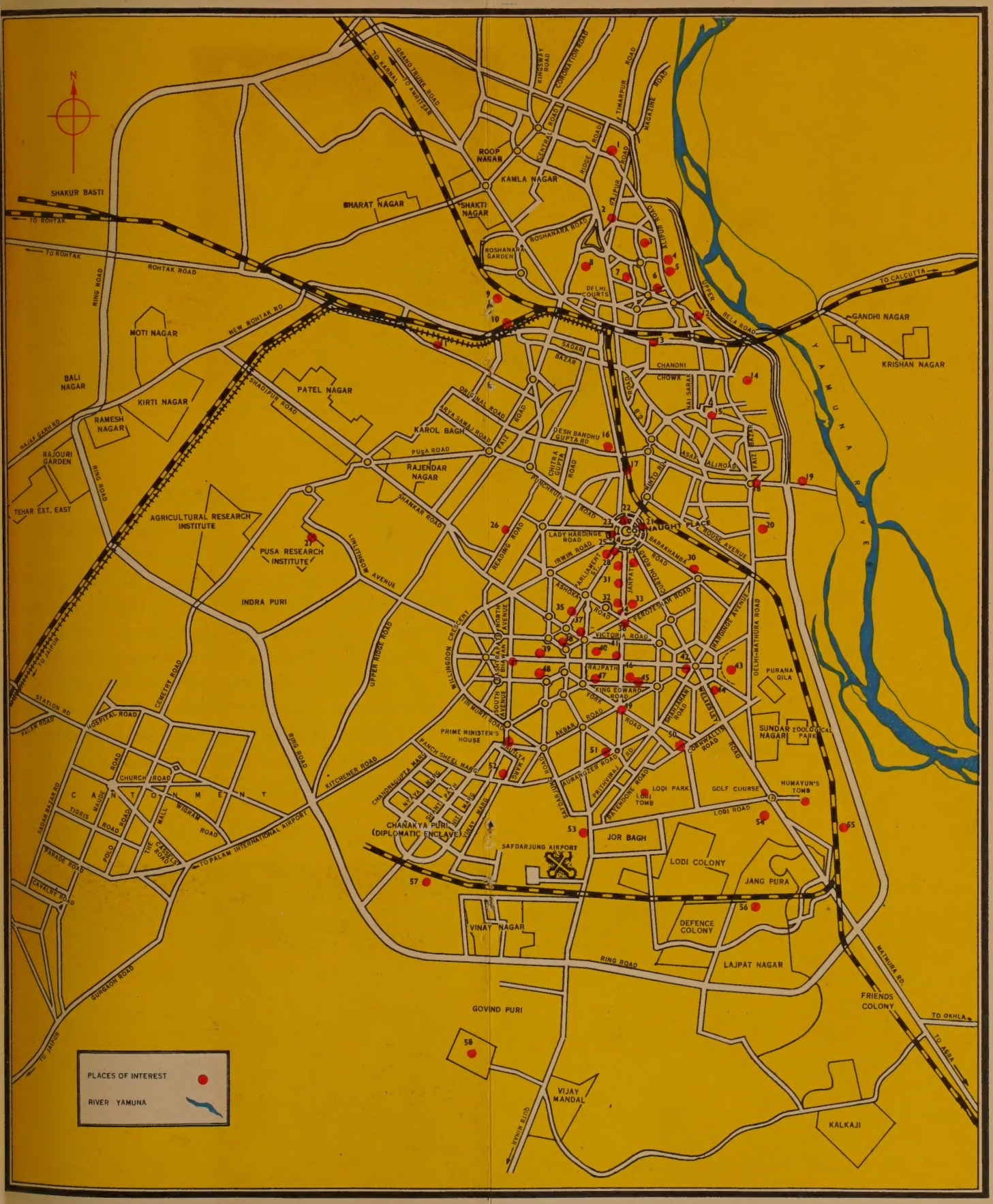
In Najafgarh some farmers alleged that their demand for paddy seeds for planting in their waterlogged lands had remained unfulfilled.

As an educated farmer of Narela said, "at the most the first rabi campaign was a half-hearted attempt at arousing consciousness" in the rural population for increasing the food production in the Union Territory. The experience of the first four weeks of the campaign, however, should help the authorities in future campaigns, he added. Though not essentially the season for food crops the authorities could utilise the date to advantage during the forhcoming kharif season, an agricultural worker said.

Times of India
21 Jan., 1959

Times of India
24 Jan., 1879

GUIDE MAP OF DELHI



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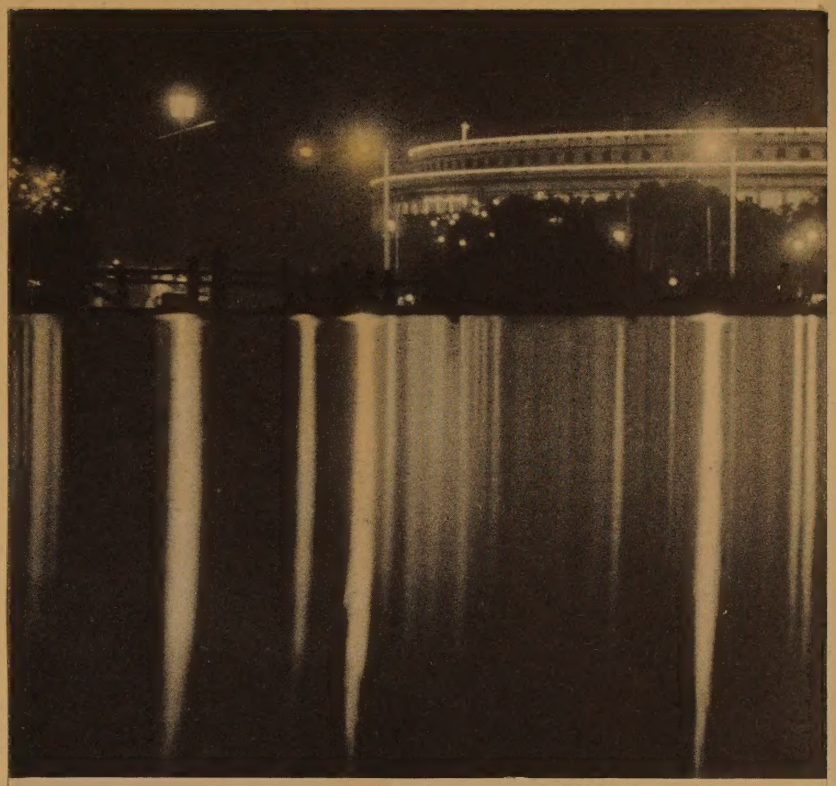
5. Home Secretary's Office. Delhi.
6. Swiss Hotel.
7. Cecil Hotel.
8. Asoka Pillar.
9. Sabzimandi R.S.
10. Kishan Ganj R.S.
11. Sarai Rohilla R.S.
12. St. James Church.
13. Delhi Junction R.S.
14. Red Fort.
15. Jama Masjid.
16. Air Lines Hotel.
17. New Delhi R.S.
18. Delhi Gate.
19. Raj Ghat.
20. Ferozeshah Kotla.
21. Odeon Cinema.
22. Plaza Cinema.
23. Marina Hotel.
24. Regal Cinema.
25. Rivoli Cinema.
26. Lakshmi Narayan Temple.
27. National Physical Laboratory.
28. Jantar Mantar.
29. Tourist Information Office.
30. Sapru House.
31. Imperial Hotel.
32. Western Court.
33. Eastern Court. (Central Telegraph Office).
34. Jan Path Hotel.
35. Broadcasting House.
36. Windsor Place.
37. All-India Fine Arts & Crafts Society.
38. Parliament House.
39. Central Secretariat (North Block).
40. Krishi Bhavan.
41. National Archives.
42. India Gate (War Memorial Arch).
43. National Stadium.
44. National Art Gallery, Jaipur House.
45. Vigyan Bhavan.
46. Central Asian Antiquities Museum.
47. Udyog Bhavan.
48. Central Secretariat (South Block).
49. York Place.
50. Ambassador Hotel.
51. Claridge's Hotel.
52. Ashoka Hotel.
53. Tomb of Safdar Jung.
54. Nizam-ud-din Aulia.
55. Nizam-ud-din R.S.
56. Lajpat Nagar R.S.
57. Safdar Jung R.S.
58. Hauz Khas.

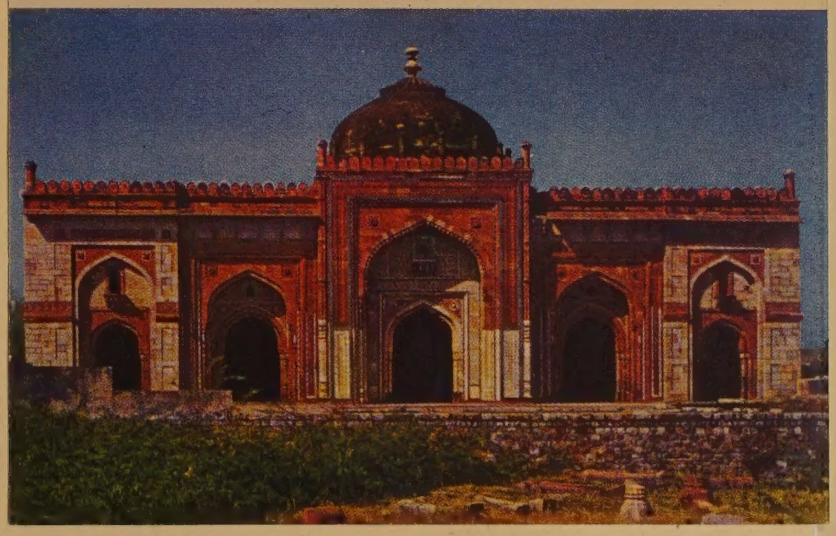
Times of India
21 Jan., 1929



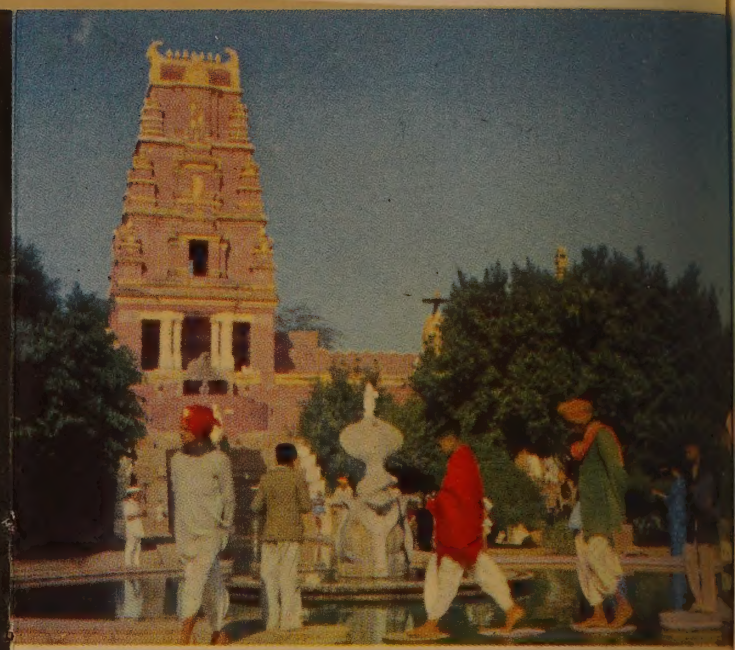
Jama Masjid : The most famous in India, and one of the biggest in the world, Jama Masjid is another imposing structure erected by Shah Jahan. With its massive outlines, imperial proportions, bulbous marble domes and slender striped minarets, it forms the most striking building in Delhi.

Raj Ghat : Situated between Old and New Delhi, Raj Ghat is the hallowed spot where Mahatma

Sher Shah's Mosque, Purana Qila



Parliament House



A pavilion on the grounds of Lakshmi Narayan Temple

Gandhi was cremated on January 31, 1948. The *Samadhi*, around which a beautiful garden has been laid out, attracts a large number of visitors.

Ferozeshah Kotla: In the midst of this ruined fortress-palace built by Ferozeshah Tughlaq in the 14th century stands the famous Asoka Pillar. Characterized by a brilliant polish, this monolithic column, 46 feet 8 inches high, carries inscriptions of the edicts of Asoka.

GROUP TWO

Purana Qila: Believed to be situated on the site of Indraprastha (of Mahabharata fame) is the Purana Qila, or Old Fort, built by Humayun and Sher Shah in the 16th century. The graceful lines of its walls look impressive even in their decay. The mosque inside the fort is an excellent example of Indo-Afghan architecture.

Humayun's Tomb: Not far from the Purana Qila stands this imposing mausoleum of Humayun built of red sand-stone and marble. Beautiful in

GROUP ONE

Red Fort: One of the principal attractions of Delhi, this historic fort was built by the great Moghul Emperor Shah Jahan. Perhaps the most magnificent palace of its time, its highly ornamented pavilions are laid out amid romantic surroundings. Diwan-i-Am, with its royal balcony containing some of the finest pietra dura work; Diwan-i-Khas, where the invaluable 'Peacock Throne' was kept; the Pearl Mosque and many other edifices give some idea of the splendour of Shah Jahan.

Fruit seller

January 25

This morning I write some more letters and work on my notes. Dr. Raychaudhuri calls and asks me to come to a Soil Science meeting at the University at 2:00 p.m. today. I tell him that I'll try but I shall likely be late. I write to Dr. Bradfield about the possibility of complying with his request that I stop in Saigon in order to look at the cat clay marshes and discuss them with the Minister of Agriculture of Viet Nam. If I go I must have an invitation from the government and someone - Ford or Rockefeller - will need to be responsible.

About 11:00 one of the Ford drivers takes us over to the Ashoka Hotel for tea and talk with Dr. Moseman. We discuss several aspects of both the Ford Foundation project and the Rockefeller Foundation project in India. Both of us feel that several members of the Ford delegation I am with will have great difficulty in being practical in terms of tropical agriculture and of existing Indian customs. Dr. Moseman tells me that he has been well impressed with the Extension Commissioner here, Mr. J. B. Nehemiah, even though he is a bit offensive to some of the scientists.

Dr. and Mrs. Ralph Cummings come to the hotel about 1:00 and take the three of us to the home of Dr. Ensminger where we have a buffet luncheon with a large group including all our delegation, the leaders of TCM (Mr. Huston and Dr. Parker), and several other Americans.

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I leave the party a bit early at 2:30 p.m. and the driver takes me out to Delhi University. Since this is situated on the opposite outskirts of the city, I get there at 3:00 just as the meeting is concluded. I realize for the first time that a general scientific congress is in progress with people from all parts of India and several foreign guests, including Prof. Tyurin from Moscow. I do not meet him but I do meet Dr. Raychaudhuri and several others. Dr. Raychaudhuri comes back with me in the car to the hotel and we have tea in the garden.

He says that the main thing our group should recommend is that the local agricultural officers be given more freedom of action. "When extension agents talk about fertilizer they should have some in their pockets," he says. He goes on to explain that the farmers know what to do and will use the fertilizer if they can get it on time. But he says that supplies are limited and that distribution is delayed with red tape. He thinks there is a critical need for more fertilizer which cannot be had because of limited foreign exchange. From the U. S., he tells me, food grains can be had on credit but fertilizer must be paid for immediately. I agree that they should buy fertilizer and machines rather than food. He says that about one-half the area needing nitrogen should also have phosphorus and that about one-fifth of it also needs potassium. Potassium needs are fairly well limited to the areas of acid soils. It is used especially for coconuts and tubers and some for sugarcane, tobacco, and tea.

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He thinks that when the government assists cultivators in building bunds that not nearly enough attention is given to the kind of soil. On many sandy soils the digging is not deep enough to bring up clay for stabilization. Then too, he thinks that the government should arrange for maintenance for at least ten years. I raise the question about requiring cultivators to use fertilizers where the government subsidizes the bunds. He says that is not at all necessary; if the fertilizers are available on time the cultivators will use them. What is needed is some way to get fertilizers from the United States with deferred payments.

He doesn't think that price supports are necessary since food is short all over the country. But I point out that the United States has plenty of food already paid for and ask his opinion about a general price support program, not to raise prices but to prevent their falling to very low levels, coupled with increased storage in both large and small towns that could accommodate a big carry-over for bad years. If the Indian Government did this seriously, it might be possible to persuade the United States Government to fill the bins in order to get the scheme started. This would not be a temporary handout but a way to use the food grains already available to start a long-time constructive program that would remove the fear of famine. He thought this would be very good but should not be substituted for fertilizer, with which I agree.

In the evening I try out the new baker. After a short rest we go to dinner. I have a little chitchat with the boys and go to bed about 11:00 p.m.

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January 26

We are up at 6:30 this morning for an early breakfast and are in the car at 7:35 to drive to our place in the stands to see the big parade of India's Republic Day.

This is much like the one I had seen and described a year ago although with somewhat fewer floats and not quite so long. The usual military units go by. Most interesting are the camel corps, the elephants, the folk dancers, and the youth organizations. It is a beautiful day for the parade, about like early May in Washington.

We are back to the hotel in time for lunch. At 3:30 we go to the President's Reception at his palace. It is a colorful and interesting spectacle with great crowds of people and a beautiful garden. We have good views of the President, Mr. Prasad, and Mr. Nehru, and even a few words with Prince Philip of Edinburgh. I try for some kodachromes but the crowd makes focusing quite difficult.

We meet Mr. P. R. Ahuja and his wife and some friends. He is Director of Hydrology in the C.W.P.C. Last September we had a pleasant meeting in my office in Washington.

We are back at the hotel at 5:15 for tea and about 6:30 take an hour or so to drive around the government buildings and in the city to see the illuminations. The main government buildings and some of the large private buildings are gorgeously illuminated with hundreds of thousands of small electric bulbs, many in color. The City Hall is especially impressive. Thousands of people are out to see these.

We drive back through the press of cars and people for dinner about 7:30. In the evening I bake my back again and go to bed about 11:00.

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सत्यमेव जयते

PROGRAMME

FOR

THE REPUBLIC DAY PARADE

January 26, 1959
6 Magh, 1880

9-30 A.M. *The President arrives in State**.

The Prime Minister receives the President.

The National Flag is broken at the mast and the President's Body Guard and the bands give the National Salute.* Simultaneously a 31 guns salute is fired.

The Prime Minister introduces the Defence Minister, Deputy Defence Ministers and the three Chiefs of Staff to the President and then escorts him to the dais.

The investiture for Ashoka Chakra Class I award. The next-of-kin of late Captain Eric James Tucker is presented to the President. The citation for the award is read and the President presents the gallantry decoration posthumously to the next-of-kin.

9-40 A.M. The Republic Day Parade (*Order of March given on the opposite page*).

10-41 A.M. The pageantry procession.

Shehnai and *Dhausa* on elephants.

A cavalcade of Tableaux.

School children.

Folk Dancers.

11-16 A.M. Fly-Past by aircraft of the Air Force (*Order of fly-past on the last page*).

National Salute*.

11-21 A.M. *The President departs in State**.

The Vice-President, the Prime Minister, Ministers and Members of the Diplomatic Corps depart.

Other guests depart.

**Every one will stand, and officers in uniform salute, when the National Anthem is played and when the President's Standard of the Body Guard is carried before them.*

ORDER OF MARCH

The Parade Commander
The Armoured Corps
- AMX Tanks
- Centurian Tanks

The Regiment of Artillery
- Field Guns
- Heavy Mortars
- Heavy Anti-Aircraft Guns
- Light Anti-Aircraft Guns
- Anti-tank RCL Guns
- Carriers

The Corps of Electrical & Mechanical Engineers Specialists Vehicles

61 Cavalry

4 (Hazara) Mountain Battery

13 Grenadiers (Ganga Jaisalmer)

Band of The Bengal Engineers

Band of The Punjab Regiment

Gentlemen Cadets—Military College

Cadets—National Defence Academy

The Corps of Engineers

The Corps of Signals

Brigade of the Guards

Pipes and Drums of 3 Para (Kumaon)

Pipes and Drums of 3/11 Gorkha Rifles

The Parachute Brigade

The Punjab Regiment

The Madras Regiment

The Grenadiers

Band of The Rajput Regiment

Band of The Sikh Regiment

The Rajput Regiment

The Jat Regiment

The Sikh Regiment

The Dogra Regiment

Pipes and Drums of The Bihar Regiment

Pipes and Drums 11 Gorkha Rifles Regimental Centre

The Assam Regiment

The Bihar Regiment

The Mahar (Machine Gun) Regiment

The Kumaon Regiment

Band of The Grenadiers Regiment

Band of The Kumaon Regiment

The Maratha Light Infantry

The Rajputana Rifles

The Garhwal Rifles

Band of The Artillery Centre

The Sikh Light Infantry

The Gorkha Rifles

Jammu & Kashmir Rifles

Pipes and Drums of the Signal Training Centre

Pipes and Drums of the Army Service Corps Centre (South)

The Army Service Corps

The Army Medical Corps

The Army Ordnance Corps

Remounts, Veterinary & Farms Corps

Band of The Army Ordnance Corps

Band of The Jammu & Kashmir Training Centre

The Army Education Corps

The Corps of Military Police

Pipes and Drums of the 3 (Rifles) Kumaon

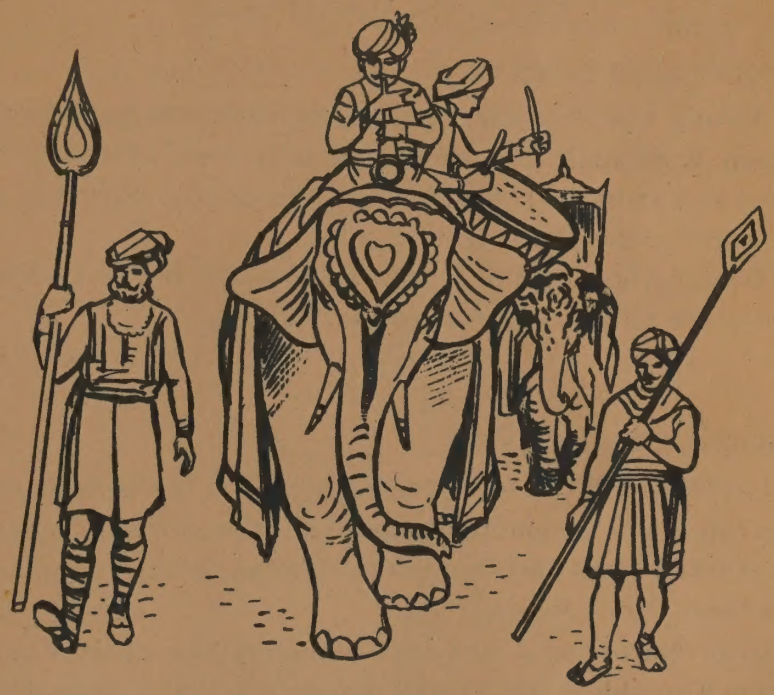
The Boys Battalion (North)
The Boys Company (Gorkha)
The Assam Rifles
Naval Band
The Navy
Air Force Band
The Air Force
Air Force Specialist Vehicles
Pipes and Drums of The Territorial Army
The Territorial Army
Defence Security Corps
Ex-Servicemen
St. John Ambulance Brigade
The Delhi Police Band
The Police
The National Cadet Corps
Cadets of the Sea Cadets Corps
Lok Sahayak Sena
Delhi Fire Brigade

ORDER OF THE FLYPAST

Canberras	12
Vampires	12
Toofanies	12
Mysteres	12
Hunters	12
Gnats	3
Toofanis	3
	66

सत्यमेव जयते

CULTURAL PAGEANT



JANUARY 26, 1959

MAGHA 6, 1880 (SAKA)

ANDAMANS & NICOBARS

A VIEW OF BAY ISLANDS

The Andaman and Nicobar Islands tableau represents the important features of this Union Territiory. The India-built merchant vessel, 'Andamans', is approaching the Chatham Island, now the seat of the Government. Also seen are the causeway connecting the island with the South Andamans and the big Cellular Jail - no more a dreaded spot - and the beautiful hill, which forms a famous landmark in the Andamans.

The second half of the float provides a glimpse of the enchanting Car Nicobar Island, complete with its typical dome-shaped hut and Nicobarese canoe.. Some young girls - children of Andaman Indians and of recent settlers - are also included in the tableau.

ANDHRA PRADESH

KONDAPALLI TOYS

Among the products of the cottage industry of Andhra Pradesh, Kondapalli toys are today known widely for their bold colours and artistry. This industry has been the mainstay of a large number of artisans in the State.

'Nandi', the sacred bull, and the horse by which it is 'drawn' are common motifs of Kondapalli toys.

ASSAM

GODDESS KAMAKHYA

The famous shrine of Goddess Kamakhya, which is situated on the top of a blue mountain near Gauhati, and the sad story of King Narakasura's devotion to the Goddess form the theme of this tableau from Assam.

King Narakasura was captivated by the charms of the Goddess Kamakhya and wanted to marry her. She accepted the offer only on the condition that the King would, in the course of a night, construct a stone causeway from the foot of the blue mountain to the temple at its peak. The King almost completed his task but when the Goddess found that she was going to lose the challenge, she contrived to make a cock crow before day-break and thwarted the King's passion.

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Besides a part of the causeway, the tableau also depicts the fatal fight of King Narakasura with Lord Krishna, who, according to mythology, had to kill this power-thirsty monarch to save the people from oppression.

BOMBAY

THE GIR LIONS

The King of the Jungle and his well-known abode—the only one in India—the Gir forests of Saurashtra, are portrayed in this tableau. The panels around the float which show typical jungle scenes high-lights the lions and their natural surroundings.

JAMMU AND KASHMIR

FISHING IN LAKES

The float from Jammu and Kashmir is a lyric on one of the main occupations of the people of the State—fishing.

Around the central figure of the fisherman, clad in his rugged garb, is the lovely lake, and nearby is the king-fisher ready to dive like a flash at the fish.

The State emblem and lovely scenes from Kashmir adorn the sides of the float.

MADHYA PRADESH

VILLAGE LIFE IN MALVA

This tableau portrays a village scene in Malva (Madhya Pradesh). It shows a typical cottage and the 'inevitable' village well and other characteristic accompaniments.

NORTH-EAST FRONTIER AGENCY

KAKALING & CHORTEN

In this float from the North-East Frontier Agency is represented one of the best examples of tribal art and architecture. The larger structure shows a 'kakaling' (gate) and the smaller one a 'chorten' (shrine). The sitting figures on either side of the shrine are those of Lamas,whereas those standing are of dancers. The entire float is painted in tribal design.

PONDICHERRY

VEERAN HORSE

The'Veeran' horse, a striking symbol of folk art of the Pondicherry area, is a familiar relic of rural masonry found all over the locality. Legend has it that this horse is the mount of the diety Ayyanar, on the latter's evil-destroying missions in aid of the distressed. Grappling with the reins of the horse are two hefty footmen, accompanied by a dog.

RAJASTHAN

SUTRADHAR & PUPPETS

The theme of the tableau from Rajasthan centres round puppetry,one of the most ancient forms of dramatic entertainment in the country. The central figure is the 'Sutradhar' literally 'one who holds the strings',who is controlling puppets which personify time, culture, history and fine arts.

Time is represented by a typical Rajasthani man; the drum he carries signifies dance and music. The tableau is full of symbols of historical events and the outstanding qualities of Rajasthanis. All these revolve round the Sutradhar, through whom art, culture and knowledge have flowed from generation to generation.

TRIPURA

TRIBAL LIFE

This tableau portrays a scene from the daily life of the people living in the picturesque valley of Tripura.

Around the stilt -borne tribal house of bamboo and thatch can be seen the daily activities of the people, particularly of women in spinning, weaving and rice-pounding. In one part of the float is shown a unique process of cultivation called 'jhuming'. The clothes of the tribal people are noteworthy for their exquisite designs and colours.

MINISTRY OF WORKS, HOUSING & SUPPLY
(C.P.W.D. - DIRECTORATE OF HORTICULTURE)

PANCHATANTRA IN FLOWERS

This tableau by the Horticultural Division of the Central Public Works Department, presents a Panchatantra story, 'the Monkey and the Crocodile'. The crocodile invites his friend the monkey on the 'Jamun' tree for lunch and the two set off together, the monkey on the crocodile's back. Midstream, the crocodile unwittingly gives away the dastardly intention behind the invitation, namely, that his wife wanted to taste a monkey's heart. The monkey, with great presence of mind, pretends that he forgot his heart on the tree and tricks the crocodile into carrying him back to safety.

The tableau shows the monkey laughing with glee and the crocodile in rage.

MINISTRY OF STEEL, MINES & FUEL

OIL EXPLORATION

The Oil and Natural Gas Commission's tableau shows the saga of oil exploration. Where the Geologist leaves off, the Geophysicist takes up the investigation. After him comes the drilling rig. The figure at the back of the tableau symbolises the emergence of crude oil from the bowels of the earth; the models all round illustrate the purposes for which these products are used. The panels depict the geological strata in which oil has recently been found in Saurashtra.

MINISTRY OF RAILWAYS

DELIVERING THE NATION'S GOODS

The tableau from the Railways depicts the tremendous magnitude of the task performed by the Indian Railways in the transportation of millions of passengers and millions of tons of goods. It also underlines the unity brought about by the Railways by linking up widely-separated areas. Bhim, the central figure, is symbolic of the mighty effort of the Railways.

MINISTRY OF DEFENCE

DEFENCE PRODUCTION HELPS NATION

The surplus capacity of the Ordnance Factories is now being utilised for the production of tractors, ploughs, fertilisers, machine-tools, precision instruments and other articles for civil consumption.

The role of defence production in helping civil industry is illustrated by the mechanical plough and fertilisers for improved cultivation and the parachutes which are used for air-dropping food and medical supplies in flood-affected areas. The float is being pulled by a tractor manufactured in the Ordnance Factories.

HINDUSTAN AIRCRAFT, LTD.

Designed in flowing lines and aerodynamic forms, the tableau from this premier aircraft factory in South-East Asia depicts its present and projected items of manufacture.

After the HT-2 trainer and the Vampire jet fighter, both of which are being manufactured by the factory for sometime, comes the Pushpak, an ultra-light aircraft the production of which has recently commenced.

At the other end are shown the Orpheus jet engine and the Gnat fighter - two items that will shortly go into production at the factory.

MINISTRY OF COMMERCE & INDUSTRY

PROMOTING INDIA'S EXPORTS

This tableau depicts the role of the State Trading Corporation which is to promote sale of Indian products abroad.

Since its inception in 1956, the Corporation has developed new markets all over the globe for a large number of Indian commodities, including raw and finished goods, handicrafts of many types. At the same time, it has been engaged in the import of machinery for the industrialisation of the country.

Some of the commodities for which the Corporation has developed markets abroad have been high-lighted. Ships that carry India's trade with the rest of the world are also represented on the tableau.

HIMALAYAN MOUNTAINEERING INSTITUTE

MOUNTAINEERING IN 1958

The Himalayan peaks shown in the tableau recall the success of the first wholly Indian expedition which in 1958 successfully climbed the Cho Oyu, the sixth highest peak in the world. One of the two Indians who reached the peak had received training at the Himalayan Mountaineering Institute. The smaller peak Trisul (which is about 23,300 ft.) was climbed by three persons after they completed their basic course at the Institute. The small peaks shown at the other end, represent passes ranging from 13 to 15 thousand feet. They were climbed during 1958 by Shri Jawaharlal Nehru who is the President of the Himalayan Mountaineering Institute and is not only a lover of the mountains,but also at the age of 69,a keen mountaineer.

Dr. & Mrs. Charles Kellogg

Republic Day

3243

The President

At Home

on Monday, the 26th January, 1959,

(6th Magha, 1880)

at 4-00 p. m.

at Rashtrapati Bhavan, New Delhi.

AN ANSWER IS REQUESTED TO
THE A.-D.-C. IN-CHARGE OF INVITATIONS.

Please bring this card with you.

X

सत्यमेव जयते

Dr. & Mrs. Charles E. Kellogg's

presence is requested at the

Republic Day Parade

26th January 1959 (6 Magha 1880)

The President will take the Salute

Invitation Office,
Ministry of Defence.

Please turn over.

गणतंत्र दिवस

श्री राष्ट्रपति द्वारा

स्वागत समारोह

सोमवार, २६ जनवरी, १९५९,

(६ माघ, १८८०)

द्वारा के ८ बजे

राष्ट्रपति भवन, नई दिल्ली ।

ए० डी० सी० (निमन्त्रण)
के पास डाक भेजिए ।

इसका निमंत्रण-पत्र साथ लाएँ ।

17922

This invitation card is intended only for the person(s) named on the card.

Children under 14 years may accompany invitees; they will be seated on durries. Servants and Ayahs will not be admitted into the seating enclosures.

Adults are requested not to sit on durries intended for children.

Seating enclosures will not be open before 6-30 A.M.

You are requested to bring this card with you and be in your seat(s) by 9-00 A.M. at the latest; and stay on until the President, the Vice-President and the Prime Minister depart at the end of the Parade.

If you wish to take photographs kindly take position at the rear part of the seating gallery.

A car park label and a sketch indicating the route to your car park are enclosed. No other car park label should be displayed.

January 27

Tea at 7:00 and then breakfast. We all go to our new office building at 26 Lodi Road. The former occupants were moved out of this nearly new building, which has been cleaned and freshly white-washed. I understand that our Indian counterparts will be here about the first of February. The plan last autumn was for us to help them prepare a report; this has been changed for them to help us prepare a report. Apparently a few at the top level are beginning to realize how very critical their food situation is.

We sit at the conference table with Mr. Nehemia, Commissioner of Extension in the Ministry of Agriculture. Formerly he was Secretary of the Indian Council of Agricultural Research. Although the Community Development Program is in a special ministry, this man heads an extension commission as a sort of technical staff within the Ministry of Food and Agriculture. He is now developing a staff here at the Center and corresponding ones in each State.

After a brief introduction by Ensminger, Nehemia speaks. At first he emphasizes that useful recommendations from our group will be within general policy and will have most opportunity for incorporation in the third 5-year plan,[1/] the preparation of which will be underway soon. Thus both long-time and short-time suggestions are needed. (This is clarified later under questioning to mean that we should make clear when our recommendations are within policy and when they call for changes in policy.)

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He emphasizes "streamlining" procedures for an intensive food program, now about 10 percent short of requirements. In the first 5-year plan agricultural production went up two or three percent each year. In the first part of the Second Plan grains went up 4½ percent per year. By the time of the Second Plan people thought that the food problem was solved so most emphasis was given to industry. But this was an error. Monsoons were good in the First Plan and they have been poor recently. Then too, many were reluctant to recognize the population problem. Death rates fell but there was little change in birth rate. Thus population is going up about 1½ percent per year or a bit more. Then too, despite the emphasis on industry in the second 5-year plan, not many people shifted out of the rural villages to industry.

There is now increasing concern with birth control and some 2,000 clinics for family planning; but these efforts have not been effective mainly because of the lack of satisfactory methods in a village life lacking privacy.

Now he thinks they must plan for an increase in food production of 5 percent per year. Plans must consider all of the factors that affect food production.

Prices are now controlled mainly to protect consumers. Yet price incentives have worked with sugarcane. In three years white sugar production has gone from one and one-half million tons to two million tons. But the use of some of the best soil has been shifted from other crops to sugarcane. I call attention to the use of price supports, not to raise prices, but to prevent very low prices and thus give incentives for good management. He mildly agrees.

He emphasizes "streamlining" procedures for an intensive food program, now about 10 percent short of requirements. In the first 5-year plan agricultural production went up two or three percent each year. In the first part of the Second Plan grains went up 4½ percent per year. By the time of the Second Plan people thought that the food problem was solved so most emphasis was given to industry. But this was an error. Monsoons were good in the First Plan and they have been poor recently. Then too, many were reluctant to recognize the population problem. Death rates fell but there was little change in birth rate. Thus population is going up about 1½ percent per year or a bit more. Then too, despite the emphasis on industry in the second 5-year plan, not many people shifted out of the rural villages to industry.

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Now he thinks they must plan for an increase in food production of 5 percent per year. Plans must consider all of the factors that affect food production.

Prices are now controlled mainly to protect consumers. Yet price incentives have worked with sugarcane. In three years white sugar production has gone from one and one-half million tons to two million tons. But the use of some of the best soil has been shifted from other crops to sugarcane. I call attention to the use of price supports, not to raise prices, but to prevent very low prices and thus give incentives for good management. He mildly agrees.

He reviews government subsidies for seeds, irrigation, etc. He says that about 315,000,000 acres are cultivated of which more than one-fifth are irrigated. Of the food grains produced, less than 30 percent get into the market. Many cultivators consume all their production.

He discusses credit arrangements and says that here again the red tape is so bad that farmers often get the credit after planting time and then use the money for something else less productive and have difficulty with repayment. Thus despite his high interest rates of 20 percent or more the village money lender has an important place because he can advance funds on time. Fertilizer use has increased rapidly. About 3½ years ago it had been difficult to move it out of the new factories. Then TCM made some available free. He says they are now producing 500,000 tons of fertilizer (this figure is not clear), which is less than one-half the need. There is no subsidy on fertilizer prices except for some equalization of freight costs.

He speaks briefly of irrigation and the lack of coordination between the department that controls the dams and large canals and the agricultural departments that have responsibility for field methods of irrigation. He speaks of several examples of canals being silted that fail to supply water and thus ruin crops.

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We discuss briefly the basic matter of proper combinations of production factors and also better provisions for maintenance of irrigation works, bunds, and tanks (ponds). He talks about the distribution of silt from the tanks and canals to the fields, which I saw last year near Bangalore.

He also discusses land consolidation in both irrigated and dryland areas.

He speaks of village cooperatives for agricultural planning as well as for supplies, marketing, and credit. He is not clear about how these might work. Some proponents suggest that non-farmers of the village might belong. Thus possibly the village cooperative might become a monopoly, first for such controlled items as seed, fertilizers, and machinery, and finally for all items. This could become dangerous.

The Community Development Program, in another ministry, has recently acquired some of the responsibility for cooperatives from agriculture, which results in some present confusion.

He goes into this problem of land ceilings and thinks they <u>will</u> be imposed. (What a pity! If this is more than a temporary transition, it means a poor peasant agriculture.) But the Congress Party has promised and is now committed. So the question is: What kind of farm organization should they have? Should the State take over the marketing, etc.?

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He goes through a complicated set of reasoning, which I question a bit, to arrive at Rs 400[1/] per year for a cultivator to be equivalent to Rs 1,200 annual net income for an industrial worker. On the average this would mean the production from 10 acres of irrigated land. He emphasizes the need for immediate decision since many cultivators are purposely avoiding improvement prior to land reorganization in order to have as high an acreage as possible, since the more productive the land appears the less acreage they will be allowed. The psychological effects of all this talk about ceilings has greatly delayed soil improvement.

He points out that the Constitution gives most authority for agricultural research and extension to the States. He reviews the history of the earlier Royal Commission and of the ICAR with its Center Secretariat, which approves research schemes that are one-half subsidized with national funds. Present legislation provides export taxes on agricultural products for funds to the Center. These funds amount to Rs 10,000,000 with the States using roughly a similar amount. He raises the question whether these funds or even more are really needed at this time. Or is the need for extension greater? He strongly infers that much of the research is quite ethereal. (I agree.)

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The extension program started in 15 pilot areas with help from the Ford Foundation. Then came the Community Development Department. This work is organized into blocks of about 100 villages each. Each block officer has a staff and a village-level worker for one to ten villages. By trying to cover the entire country the number of blocks has been greatly increased, which lowers the funds for each. But would it be better to concentrate in the most promising areas for meeting the food needs. So far the pressure has been to give equal treatment.

He supports the notion that officers of the State departments of agriculture should not be responsible for supplies. I suggest that this is good theory but can they coordinate recommendations for fertilizers and seeds with the supplying agency? He seems to think so but doesn't know how.

We break up about 1:00 and return to the hotel.

After lunch we take the cars for the Ministry of Agriculture and call at the office of Mr. K. R. Damle, Secretary, Ministry of Agriculture.

He says that we should find out why their food production schemes do not succeed. People in India have the enthusiasm, still the programs fail. He asks, "Have we approached the cultivators correctly? Do they speak freely to us? How can we find out the real needs of the cultivators? Are there defects in our administrative machinery? Does it take too long to do the simple things? I know you put on a big and successful food program in the United States during the war: if we must go on a wartime basis then tell us. Are our technical

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people properly trained? Look at the curricula and methods in our colleges and tell us if they are right. Are the spheres of our various technical and administrative people defined correctly?"

He suggests the need for special programs for wheat and paddy. I suggest that perhaps a serious difficulty is the fact of too many unintergrated programs. Part of our wartime success may have been due to our attempts to combine all phases into one program.

They hope to have some short-run goals that will be consistent with the longer run aspects of the third 5-year plan.

Since Mr. Damle has another conference scheduled, we go to a separate room for a team conference with Ensminger. He gives us the background for Community Development. Nehru saw in this scheme the chance to redeem his pledge to remove the burden of poverty. He tells us that Sir V. T. Krishnamachari, Vice Chairman of the Planning Commission, is the strongest advocate for Community Development. Community Development must deal with all phases of village life since India cannot afford two village programs. He thinks that only a few of the leaders appreciate how really critical the food problem is. He again reviews the plan for 100 villages in a block with a village worker for each one to ten villages. The limit should be five not ten, he says. (There are 500,000 villages averaging (between wide extremes) roughly 100 families or 600 people.)

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Village-level workers in the scheme are 18 to 26 years old. They have rural backgrounds and high school diplomas or better. They receive six months training at least in extension methods and now somewhat more training in agriculture. Women workers for simple home improvements are being added, perhaps a bit too fast for the training facilities.

After some discussion about expense accounts, other housekeeping problems, and even tiger hunts, we leave for the apartment of Miss Moline where we have tea with some of the block leaders and several farmers from areas in the U.P. near Allahabad. We ask them several questions and they ask us some, especially about the reclamation of salty soils and soils with kanker pans. After an interesting session I return to the hotel about 7:30.

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Tea at 7:00 a.m. Then breakfast, work on notes, and to the office at 9:00 a.m.

Dr. Carl Taylor of the United States speaks to us. He asks, "What has happened to this excellently designed and well-launched (Community Development) program?" He says that the extension workers in the villages were given too many jobs to do besides the agricultural jobs they were trained for, such as road building, processing loans, handling seeds, and distributing fertilizers. The program rapidly became very big, including the administrative work in connection with grants of materials and money. Thus the top administrative people began to call the signals, rather than the block staff helping the village-level workers. The villagers did not get a chance, he says, to develop the kind of program they wanted. For these reasons India did not get the food production they expected.

(I feel sure that the matter is not so simple, nor so completely dependent on extension. Taylor's immodesty is monolithic. He says that his ideas are based on his own experience in underdeveloped countries throughout the world and that everywhere the problems are the same! He says that all local administrators underrate their own farmers! His experiences are not like mine. The India scheme he knows to be ideal!)

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Taylor insists that someone else besides the village-level worker should do the administrative jobs and handle the materials. But I cannot get him even to suggest an alternative, except cooperatives, which he himself says cannot really begin to function for some time! Yet he repeats, "Let the extension people do only extension work." (It would be more sensible to think in terms of priorities for a food program.) He says that the village goals are consistent with national goals. I doubt this. But I do agree with him that the villages are not the homogeneous units that some suppose. For example, the weavers in the village have little concern with soil management.

We have some very sharp discussion about interactions. I point out that this overwhelmingly important matter is not even touched on in any of the material that I have seen dealing with the program under discussion. I point out that the little manual for the gram sevaks (village-level workers) is extremely deficient. I don't believe that any of these people working in the Ford Foundation understand the principle. They have spoken of demonstrations on fertilizers, on seed, on bunds, on irrigation, and so on as single demonstrations whereas none of them rarely give a convincing increase alone and, when tried, often discourage the cultivator; whereas in combination 5-fold increases may be had.

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I again press Taylor and Ensminger for constructive statements on just who should handle the seed and fertilizer during the next two or three years. No reply.

About 10:45 we leave for the American Embassy. At 11:00 we meet the Ambassador, Mr. Ellsworth Bunker, and he gives us the usual statement about the strategic place of India in the present critical situation. The tempo of development must be stepped up and when it is there will be even greater stresses on the economy. In India political independence came before economic independence so progress is urgent. He says that according to the Planning Commission population is now increasing at 1.7 to 1.8 percent annually. He speaks of the breakdown of the Hindu joint family. Food and clothing make up 70 percent of the cost of living. Thus a rise in food costs is very serious. Food prices are now held down by American imports sold for rupees. He does a nice job of summarizing India's policy of non-alignment to reduce tensions.

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After leaving the Ambassador's office I register at the Embassy for myself and Mommy and take a shot of gamma globulin. We return to the hotel for lunch at noon.

We go to the office at 3:00. Mr. Wendell Holman of TCM speaks briefly to offer their services and to give us some copies of recent reports.

Mr. Amir Raza, Chief, Land Reform Division of the Planning Commission and Mr. K. R. P. Kartha, livestock specialist of the Extension Commission meet with us.

Mr. Raza speaks. Land reform deals only with the institutional arrangements to facilitate the use of good techniques, help furnish incentives, and remove certain obstacles for production. In India much of the land was cultivated by insecure tenants. Many of the rents were exorbitant, one-half of the crop or more. In 1955 about 24 percent of the cultivated land was worked by tenants. He says there are now about 1.5 acres per agricultural person or about 7.5 acres per family. About 60 percent of the owners have less than 5 acres. There were 45,800,000 landless cultivators in 1951. Thus there is need for land redistribution. He also emphasizes the need for consolidation of scattered holdings.

He explains the present thinking on cooperative farming. One kind of cooperative handles services but each owner works his own land. He speaks mainly of the second kind where the land is pooled into joint farms. Apparently this is firm policy but details are not yet worked out completely. The economic organization would resemble

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the Soviet collective, he says, except for small size and the absence of force. But he insists that the individuals would have more incentives than in the kibbutzim of Israel. Of the collectives already started some do well and others badly because of a lack of incentives. He admits that the stigma of Communism tends to fall on these farms. Yet he feels this is an historical accident. Actually, he says, industry has already gone this way in the advanced countries where the industrial worker has little to say about the operation of the business. He insists that cooperative farming does not need to develop in other countries as it has in the USSR.

He says that probably it was in the minds of many in the Congress Party that the land released by imposing ceilings on individual ownerships would be used for cooperative farms.

Their approach to the ceiling was roughly three times the acreage that a family could farm by itself with temporary labor for harvest. He says that ceilings will not be placed on larger well-operated land units.

They have had the question of whether land released by ceilings should be given to small holders or to landless laborers. Originally the Congress Party solved the matter by putting the two together even though there is not enough land for both! Some of it is also to help enlarge small units caused by dividing holdings between owners and tenants. Recently it was agreed to give displaced tenants the first opportunity with the larger areas used to establish cooperative farms for the landless.

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For land needing reclamation for cultivation, in some States the government can take over the land by purchase or lease, put it into shape, and recover the costs.

Sanctions are being considered for those cultivators who do not farm well after they have had full opportunity for learning the techniques and acquiring the materials. The government in the Punjab requires the control of pests and diseases. In some States, soil conservation work can be done on the land and the cost recovered from the owners.

We discuss this whole problem a bit. I feel strongly that these kinds of law should be strengthened and actively enforced.

At the last meeting of the Congress Party further emphasis was given to cooperative farms for the landless. When cooperative farms are developed from existing holdings, shares depend on the size of the original contribution, in part at least. An owner may withdraw from the cooperative and take with him an area of land equivalent to his contribution.

He says that about one-half of the common lands have been taken over by State governments but are used according to local customs.

He touches on the cattle problem a bit. He says there is castration of poor bulls and that slaughter of cattle does go on; but obviously these cannot be put into official schemes.

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Compensation for the excess land over the ceilings is less than the sale price but owners are protected from unfairly low compensation by the courts. The government does not pay more than the new owner can pay with normal good management.

Formerly, women did not inherit land; but recently daughters share with sons. Yet laws do not allow extreme fragmentation. But these laws are hard to enforce. Three sons may, on paper, operate a small holding as a unit, yet informally each cultivates one-third of it. But if several children inherit two acres, they may not divide it. (Added later: Actually few, if any, States have such laws now.)

He says that under British rule in some areas, land agents were used to collect taxes. They squeezed the cultivators very hard. To make amends, tenants were given protection.

Elsewhere tenants were dealt with directly, as citizens. At first they were better off, but money lenders got much of the land. So at the end, the good system turned out badly and the bad system well.

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We have an early dinner. For the fourth night I bake my back. To bed at 10:00 p.m.

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January 29

We leave the hotel at 8:35 a.m. and reach Delhi University at 9:05 a.m. for the first of a two-day orientation seminar on India. The first speaker on How India obtained freedom and objectives of independent India, Dr. Anup Singh, a member of Parliament, is very good.

He emphasizes that all current problems had their origin under British rule! The problem with Pakistan is essentially unsolvable. Originally the Hindus and Moslems got along well together but the British exploited their differences. This fact led to partition and the problem of the refugees. He discusses briefly the problem of Kashmir for which he sees no early solution. He discusses the constitution briefly. It is long, came from many sources, and is somewhat lacking in unity.

In planning, India is trying to combine State planning and free enterprise. He discusses land ceilings. Although the constitution provides equal rights for women and abolishes untouchability, these do not go into effect at once.

The four main political parties are: (1) The National Congress, (2) Socialist, (3) Communist, and (4) Jan-Sangh. This last thinks that partition should have been avoided at all costs. The big political problem now is the split in the Indian National Congress Party.

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LIST OF SPEAKERS

January 29, 1959:

Subject: How India obtained Freedom and Objectives of Independent India

Speaker: Dr. Anup Singh,
Member of Parliament,
Rajya Sabha (Upper House),
New Delhi.

Subject: Indian History and Cultural Heritage

Speaker: Dr. Bisheshwar Prasad,
Professor of History,
University of Delhi, Delhi.

Subject: Geography of India

Speaker: Professor A. Dasgupta,
Head of the Dept. of Business Management,
Delhi School of Economics,
University of Delhi, Delhi.

Subject: Constitution of India

Speaker: Dr. M. V. Pylee,
Head of the Dept. of Economic Administration,
Delhi School of Economics,
University of Delhi, Delhi.

January 30, 1959:

Subject: Religion in everyday life

Speaker: Shri Kaka Saheb Kalelkar,
Member of Parliament,
Rajya Sabha (Upper House), New Delhi.

Subject: Social life in India

Speaker: Shri N. S. Ranade,
Professor, Delhi School of Social Work, Delhi.

Subject: Community Development & National Extension Blocks

Speaker: Shri A. Prakash, I.A.S.,
Deputy Secretary,
Ministry of Community Development,
Government of India, New Delhi.

Subject: Five Year Plans

Speaker: Dr. K. N. Raj,
Professor in Monetary Economics,
Delhi School of Economics,
University of Delhi,
Delhi.

He asks, "How far can India carry out most schemes, compared to China and the Soviet Union? Many Indians (not so much the people as the politicians) demand results that can only be had by a dictatorship.

He criticises the bureaucracy of the present Civil Service, yet he has no suggestions of what to do except fire the bad ones. He asserts, however, that this British-trained Civil Service carried them through the early difficult days.

He points out conflicts between old customs and new plans. For example, a cultivator may have savings that should be used on machinery; but it all goes for a marriage dot!

Dr. Bisheshwar Prasad reviews the history of India in standard terms. But I do not hear all of it.

I leave about noon and go to the office of Dr. M. L. Soni, 24 Barakhamba, for the repair of a broken filling. He tells me what I already know, that much of the wall of the tooth is lost. He drills, digs, and drills. Ouch! Finally he fills it. His American equipment seems excellent. His drills are sharp. He impresses me as both a precise, fast, and skillful worker and a fine gentleman.

I go to the hotel for a "soft" lunch, with no chewing. Between 2:00 and 2:25 p.m. I drive back to the sessions at the University. The last speaker on The Indian Constitution, Dr. M. V. Pylee, a graduate of the Harvard Law School, is very good.

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He points out that the constitution is very long and complicated. It was derived by study of many older ones. Although freedom was had on August 15, 1947, the constitution was not accepted until January 26, 1950. India recognizes the Queen as the head of the Commonwealth, but not as head of the State. The head is a president chosen by electors - the members of all State parliaments plus those of the Union Parliament.

Elections are conducted impartially by an Election Commission, comparable in status to the independent judiciary. Two have been held. They come every 5 years, or more frequently by order of the Prime Minister if he chooses after failure to receive a vote of confidence.

The constitution has strict safeguards of individual rights. Appeal can be had directly to the Supreme Court.

The constitution spells out the general direction that the government should take in bringing about the kind of society defined in it.

The independent judiciary is in one system, not two as in the United States.

The constitution provides for a federal system. It lists, (1) powers of the States, (2) powers of the Center, and (3) powers for either, but in cases of conflict the Center has jurisdiction. In contrast to the United States any powers, duties, or functions not specifically listed belong with the Center.

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The governments of the Center and of each State are "cabinet" or parliamentary. The Parliament has an upper house and a lower house.

Since some want to go to the ceremony called, "Beating the Retreat," we leave at 4:00 p.m. Mommy goes to the ceremony and I return to the hotel. I stop at the Ford Foundation and pick up the passports and film for all. The films are all mixed up. I bring them all to my room and let people sign up for and take what they had ordered.

We have an early dinner. I bake my back and am early to bed.

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Again we leave the hotel about 8:30 and arrive at the University about 9:00 a.m. for lectures.

Shri Kaka Saheb Kalelkar talks to us on Religion in everyday life. He is a member of Parliament, a philosopher, a friend of Gandhi's, and a vegetarian.

Hinduism, he says, is monotheistic but has been described in different forms. God creates, protects, and destroys that which is bad. Thus the several aspects of God may be expressed by separate deities. God is one; and the Universe is one aspect of God. All life is one. Every person is a part of One. Who kills another also kills himself. If there are differences, when one sacrifices himself through service the differences disappear.

Hinduism has many aspects or creeds. Each may be right in its own way, even the atheist. So Hindus are tolerant and feel that each religion should have its own way.

One cannot separate religion from life. All life is religion. (Some people even take sugar into the common land to feed the ants.) (See also: The Hindu way of life.)

He says that Gandhi advocated "birth control" of cows and better breeding. On birth control for Asians, some say why not just fill up the Soviet Union, Australia, South America, and Africa? Then all can later practice birth control.

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He admits that many in India do not appreciate the urgency of the food problem, partly because only recently have they had the responsibility to do something about the problem.

He is a very nice old man of 73 with a long white beard and kindly manners.

At 10:50 I leave for the dentist. He polishes the filling made yesterday and says it should last many years. I pay 50 rupees. I return to the hotel for lunch at noon.

While I am with the dentist Mommy takes the following lecture notes:

Shri N. S. Ranade, Professor of the Delhi School of Social Work speaks on Social life in India. He tells us that India is essentially a rural country and if one asks a person living in an urban area where his home is, he will give the name of the village from which he came and to which he hopes to return. Only recently is there a group developing with no ties to a village. In the past each village was an isolated area carrying within itself all necessary services and the people rarely going away from it and not touched by modern ideas. A change is coming about by increased communications and the new political set-up. Elections bring outside persons to villages to campaign. (At this point - 11:00 a.m. - a two-minute silence was observed in tribute to Gandhi. He was shot at this time on the 30th of January.) By and large, village life is the same with changes coming very slowly. The pressure for land is causing migration from villages to urban areas.

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The social life is regulated by the caste system and the joint family. There are many castes but he gives us four major ones: (1) Brahmins - priests and educators; (2) Kishetriya - warriors; (3) Vaishya - traders; and (4) Shudra - service. The Shudra caste was given the name of Harijan (children of God) by Gandhi.

A person born to a caste had to remain in the same caste. In villages this still exists, but there is some breaking down in urban areas. Castes are forbidden by the constitution but only very slowly is change being made. Marriages between castes are still very uncommon. Concessions are being made to lower castes by the government. Lower castes are being educated at no cost to help remove stigma. In Mysore State 75 percent register as backward classes to get help.

The caste defines what, where, and with whom one may eat.

If one violates caste taboos, for small violations the punishment may be fairly light, such as fines, giving alms, etc.; for greater violations the penalty may be orders to feed the community, or denial of smoking from the common hukka; for serious violations expulsion from the caste for varying periods is meted out.

The joint family is extremely important in determining the Hindu way of life. It provides for needs, defines social contacts, gives security, provides for old age and disability, and demands that the person identify himself completely with the family. It is not yet possible for the State to provide such security. The joint

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family is undergoing changes. Physically the families are too large to live together in urban areas, but psychologically the bond is very close. Each member is responsible for the welfare of both near and distant relatives.

An unmarried person is not considered in a favorable light. Marriage is sacred and divorce among the middle classes is seriously frowned on, although recently legalized. Divorce is common in the lower castes. Children are wanted; boys are preferred over girls. The age for marriage is going up. The legal age is now 14 years.

Women's place is in the home where she is an important figure. She runs the household and no major decisions are made without consultation with her. Recently women have been receiving higher education and they are in all professions now.

Industrialization in urban areas is recent and is bringing about fundamental changes of occupation in the caste system. There is a movement of those in high castes to factory work and those in the lowest castes are moving up.

In India there are 14 major languages. Generally persons of the same language live in the same area; but in urban areas there is a growing amalgamation of the linguistic groups.

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Then A. Prakash, Deputy Secretary of the Ministry of Community Development speaks on Community development and the national extension program. He explains the program much as we have heard before.

1. Village-level worker (gram sevak) for all service in one to ten villages. Each village has a panchayat elected by the people with a subcommittee on agriculture with which there is a gram sahayak (village helper).

2. Block development officer with a technical staff and a non-salaried advisory committee, to be elected in the future, which meets about once each month.

3. The district office, under an "administrator" or "collector" (who is rarely trained in agriculture, I fear) is a replica of the block office with a higher level technical staff. Here also is a non-salaried advisory committee with members of parliament, and so on.

4. The division office is headed by a commissioner to whom collectors report.

5. At the State level is the Director of Agriculture and heads of technical departments. There is a State Development Committee, headed by the Development Commissioner with heads of departments; and also an advisory committee on community development headed by the Minister with members of the Parliament and of the State Assembly.

The whole sounds very bureaucratic to me. (Added later: It seems to me that coordination is achieved only where the Chief Secretary heads the State committee for the purpose.)

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Next, Dr. K. N. Raj discusses the Five-year plans. He says that in 1951-1952 the rate of investment in India was about 5 percent. They planned to increase this to 7.5, 11, and 15 percent at the ends of the 5-year plans. Just now the rate is about 10.5 percent. The national income is increasing at about 4 percent per year. This means a 2 to 2.5 percent per capita increase, with highs and lows. They hope to increase both investment and standards of living.

In 1953-54 they had a big increase in agricultural production. Since then they have had increases in commercial (or industrial) crops but little increase in food grains. But 1958-59 promises to be quite good. On food grains they have the problems of (1) getting production and (2) getting it into the markets. Now about one-third is marketed and two-thirds of this is sold locally in or near the village. Since the urban population is growing rapidly, it is necessary to get more food grains into the cities.

He says that the larger farmers and traders hold back stocks for higher prices. The small man must sell immediately after harvest so he always gets a low price. Then if the outlook is for lower prices the stocks are suddenly sold with a catastrophic reduction in prices. For these reasons some thought is being given to nationalizing the wholesale trade.

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He says that exports cannot be expanded enough to buy machines; so steel mills and the like are necessary in India. Even this puts a very heavy strain on foreign exchange while the basic industry is being developed. Since wages are being paid, this period tends to be inflationary, especially when food is scarce. Thus a lack of food grains could severely limit the rate of investment.

I present the bare outlines of a plan that has been forming in mind: The use of PL 480 funds to help build storage in both large cities and small towns and U. S. grain to help fill the bins as a safety carry-over of stocks to be on hand as a part of a long-time plan, with guaranteed farm prices and with consumer protection against famine or very high prices. Then foreign exchange could be used for chemicals and machines rather than food. His reaction is very favorable.

But he emphasizes that some 6 to 19 prosperous farmers in each village control things now. They are commonly also traders and moneylenders or work with them. He fears that cooperatives are dominated by these people and become "rackets" to the small man. The power of these people within the village is truly enormous. I ask: "Are you saying that if the power cannot be shared democratically, the same will happen to them as to the Ukranian kulaks?" He replies, "Exactly."

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He says that Communism is making headway, especially in the south, where many villages have 40 percent landless (as contrasted to some one to five percent in the Punjab). He also says a bit about a fascist party, especially in Madras State, called Draivda Kazhazam. They appeal to the local people, including the landless, on a non-Aryan, racial basis. Even the Congress Party has some of these right-wing racists in it.

Dr. Raj is certainly an able man - a product of the London School of Economics, including Harold Laski. He insists that any program developed must break the power of the few families in the village. Now they bribe public officials to get more irrigation water and other favors. By inference, he is saying that they dominate the existing programs.

We are back to the hotel about 5:30 for tea and work on notes. We go for dinner chez Ensminger about 7:00 p.m.

He thinks that Communism is making its effort in the cities through the educated unemployed and the trade unions. They will, of course, appeal later to the now inarticulate landless.

He raises two propositions:

(1) Rent the whole village land, say in five villages, employ the people, and do model farming, with bullocks, for 2 or 3 years.

(2) Take one or more districts (300 in India) and work out new administrative machinery so as to tackle this great problem of bureaucracy.

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January 31

A group of us leave the hotel at 8:00 a.m. with Ensminger to visit the Khanpur Village Project just west of Delhi briefly, This is operated directly by the Ford Foundation. (It seems my lot to tip our driver; I give him Rs 18 for the week.)

First we look at a new brick kiln. The material is a yellowish-brown fine sandy loam of alluvial origin in an almost flat plain (K-2662). The bricks are first kneaded by hand (K-2663), molded, partially dried, firmed in a machine press, and then fired, using coal for heat. A high percentage of good, water resistant bricks is produced. These are used for house walls, roads, etc. The economics of the whole experiment is now being worked out. It looks good.

We look briefly at a 30- to 35-foot charas well (K-2664). The water is pulled up by bullocks moving down an inclined plane. A rope goes over a pulley above the well and is attached to a large leather bucket. With two bullocks and three people they can bring up 30 gallons per minute for irrigation through small ditches (K-2665).

We walk through the village (K-2666). They have a nearly new school, community building, and council house. We go through a courtyard, across the common, and out to an experimental well and power plant operated by bullocks. I gather that in the future the two will be separated. Here they can pump 100 to 150 gallons per minute into a large brick, earth, and cement experimental tank some 6 to 8 feet above ground level. One pair of bullocks is used at a time (K-2667). They can produce 4.5 kw. of direct current.

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K-2662. January 31, 1959.
Khanpur Village, near Delhi.
Brickyard near experimental kiln.

K-2663. January 31, 1959.
Khanpur Village, near Delhi.
Kneading bricks.

K-2662. January 31, 1959.
Khanpur Village, near Delhi.
Brickyard near experimental kiln.

K-2663. January 31, 1959.
Khanpur Village, near Delhi.
Kneading bricks.

K-2664. January 31, 1959.
Khanpur Village, near Delhi.
Charas well in action.

K-2665. January 31, 1959.
Khanpur Village, near Delhi.
Irrigation ditch (for wheat).

K-2664. January 31, 1959.
Khanpur Village, near Delhi.
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K-2665. January 31, 1959.
Khanpur Village, near Delhi.
Irrigation ditch (for wheat).

K-2666. January 31, 1959.
Khanpur Village, near Delhi.
Village street.

K-2667. January 31, 1959.
Khanpur Village, near Delhi.
Bullocks on experimental well.

K-2666. January 31, 1959.
Khanpur Village, near Delhi.
Village street.

K-2667. January 31, 1959.
Khanpur Village, near Delhi.
Bullocks on experimental well.

The newer models will be simpler. With a pump costing Rs 2,500 to 3,000 they can have water for 35 to 50 acres.

The electric generator may take 4 to 6 bullocks. The power is stabilized with batteries. It will be used for lights in the village and for a model carpenter and metal shop.

We take a quick look at the tank. It hold 20 acre-inches. It is split into two parts. Now one is nearly full and has fish in it. They hope to work out a scheme under which each cultivator uses his own bullocks to pump into the tank according to his requirements for irrigation water.

The shop is very neat. It has a brick floor, a metal and asbestos roof, and small rooms at one end. They are starting to make furniture. Ensminger hopes to have a local manager from Delhi and to use the local landless labor from some 10 villages. Full operation cannot be had until the new bullock-driven power unit is in.

We return to the hotel about 10:15 a.m. I work on notes during the rest of the day until about 6:00 p.m. when we go to a reception at the Ensmingers. Here I meet Indians that I had met last year and several new people. The list of invitees follows:

Mr. and Mrs. C. R. Eskildsen, Agricultural Attache, American Embassy

Mr. James P. Hartman, Agricultural Attache, American Embassy

Mrs. Howard Houston

Dr. and Mrs. Frank W. Parker, Chief, Agricultural Division, TCM

Mr. and Mrs. Ralph N. Gleason, Deputy Food and Agriculture Officer, TCM

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Mr. L. M. Humphrey, Agronomy Advisor, TCM

Dr. and Mrs. Ralph Cummings, Representative, Rockefeller Foundation

Dr. and Mrs. U. J. Grant, Assistant Field Director, Rockefeller Foundation

Mr. and Mrs. A. Basch, Representative: International Bank for Reconstruction and Development

Mr. and Mrs. K. A. Bennett, FAO Representative

Dean and Mrs. J. H. Longwell

Ford Foundation People

Miss Ellen L. Moline (Consultant in Home Economics)
Miss Jean Joyce (Executive Associate)
Dr. and Mrs. J. Paul Leagens (Consultant on Extension Training)
Dr. Howard W. Beers (Consultant in Rural Development)
Dr. and Mrs. Everett Woodman (Assistant to the Representative)
Mr. and Mrs. Gordon H. Parker (Assistant to the Representative)
Dr. and Mrs. B. P. Pal, Director, Indian Agricultural Research Institute

Mr. and Mrs. A. V. Pai, Secretary to President of India

Professor and Mrs. V. K. N. Menon, Director, Indian Institute of Public Administration

Mr. and Mrs. Singhal, Officer in charge of Khanpur Project

Dr. V. K. R. V. Rao, Vice Chancellor, University of Delhi

Mr. and Mrs. B. Ganguli, Director, Faculty of Social Sciences, University of Delhi

Mr. and Mrs. Eric da Costa, Editor, The Eastern Economist

Mr. and Mrs. M. V. Desai, Editor, Times of India

Mr. and Mrs. D. R. Mankekar, Editor, Indian Express

Mr. and Mrs. Durga Das, Editor, Hindustan Times

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Mr. and Mrs. D. R. Mankekar, Editor, Indian Express

Mr. and Mrs. Durga Das, Editor, Hindustan Times

Mrs. Watson Sims (Mr. Sims won't be at the reception. He is a correspondent for Associated Press of America.)

Mr. and Mrs. Donald S. Connery, Chief of Bureau, Time and Life International

Mr. and Mrs. M. S. Sivaraman, Adviser Program Administration, Planning Commission

Mr. and Mrs. S. V. Ramamurthy, Adviser Program Administration, Planning Commission

Mr. and Mrs. M. R. Bhide, Adviser Program Administration, Planning Commission

Mr. and Mrs. W. Wanchoo, Secretary, Dept. of Expenditure, Ministry of Finance

Mr. and Mrs. N. C. Sen Gupta, Joint Secretary, Ministry of Finance

Mr. and Mrs. A. K. Roy, Secretary, Ministry of Finance

Sir and Lady N. R. Pillai, Secretary General, Ministry of External Affairs

Dr. and Mrs. S. C. Roy, Commissioner (Training) Ministry of Community Development

Dr. and Mrs. J. C. Ramchandani, Director of Extension Training, Ministry of Food and Agriculture

Mr. and Mrs. K. R. Damle, Secretary, Ministry of Agriculture

Mr. and Mrs. B. B. Ghosh, Secretary, Ministry of Food

Mr. and Mrs. Surendra Singh, Agricultural Production Adviser, Ministry of Food and Agriculture

Mr. and Mrs. S. K. Dey, Director of Administration, Extn. Wing, Ministry of Food and Agriculture

We are back to the hotel about 7:30 and soon have dinner. I bake my back, read a bit, and so to bed.

TOURIST MAP OF INDIA (North Part)

USDA

Fold-out Placeholder

This fold-out is being digitized, and will be inserted at a future date.


JAMMU AND KASHMIR
HIMACHAL PRADESH
PUNJAB
THAR
MIRPUR
Naushahra
RIASI
Bhimbar
Akhnūr
UDHAMPUR
Ramnagar
Bhadarwāh
JAMMU
GUJRAT
Sāmba
Dalhousie
SIALKOT
Then
KATHUA
CHAMBA
Wazīrābād
Chak Amru
Daska
Pasrūr
Kotla
DHARMSALA (KANGRA)
Pālampur
Manali
15194
Bara Lacha Pass
16047
GURDASPUR
Pathānkot
Mukerian
Kāngra
Dera Gopipur
Jogindarnagar
Kalu
Pulga
Dera Nānak
Dhārīwāl
Qādiān
Batāla
Dasūya
Jawala Mukhi
AMRITSAR
Ajnāla
Hariāna
Gagret
Hamīrpur
MANDI
LAHORE
Tanda
HOSHIARPUR
Sundarnagar
Rāmpur
Beās
Tarn Tāran
KAPURTHALA
Una
Jaijon
Luliāni
Patti
Sultānpur
JULLUNDUR
BILASPUR
Nangal Dam
Kasur
Harīke
Bhagwara
Nūrpur
Nawāshahr
SIMLA (MAHASU)
7235
Narkanda
Phillaur
Rāhon
Kandaghāt
FEROZEPORE
Māchhiwāra
Rūpar
Kasauli
LUDHIANA
Kālka
Solon
Moga
Jagraon
CHANDIGARH
Chakrāta
Fatehgarh
Fāridkot
Rāikot
Sirhind
Kot Kapūra
NAHAN (SIRMUR)
Maler kotla
Fazilka
Muktsar
Barnāla
Nābha
PATIALA
AMBALA
Mussoorie
Rajpur
Tehri
DEHRA DUN
2232
NARENDRANAGAR (TEHRI GARHWAL)
Chhachhrauli
Jagadhri
Devaprayāg
Rishikesh
BHATINDA
SANGRUR
Bhunarheri
Abohar
Malout
Somana
GANGANAGAR
Mandi Dabwāli
Pehowa
Pipli
SAHARANPUR
Roorkee
Hardwār
Jākhal
Kaithal
KARNAL
Kotdwāra
Hanumāngarh
Narwāna
Najībābād
Fatehābād
Muzaffarnagar
Naraura
Sirsa
Kairāna
Nagina
Pānipat
Khatauli
BIJNOR
Jānsath
Jind
Chāndpur
Gohāna
HISSAR
Bhādra
Hānsi
Mahum
Bāghpat
MEERUT
Dhanaura
Amroha
ROHTAK
Sonepat
Garhmukteswar
Bhiwāni
Bahādurgarh
Hasanpur
Sadulpur
Bāhl
Jhajjar
DELHI
Ghāziābād
Sambhal
Dādri
GURGAON
BULANDSHAHR
Sardārshahr
Loharu
Mahrauli
Anūpshahr
Malsisar
Ballabgarh
Daokaur
CHURU
Pataudi
Mahendragarh
Rewāri
Palwal
Ratangarh
Mandawa
JHUNJHUNU
NARNAUL (MAHENDRAGARH)
Nūh
Khurja
Khetri
Nizāmpur
Tappal
Fatehpur
Tijāra
Dadon
Sāndwa
Maonda
Firozpur Jhirka
ALIGARH
Sujāngarh
Nohjhil
Lādnun
Bānsur
Sikandra Rao
Kāman
SIKAR
Prāgpura
Kot Pūtli
ALWAR
Pahari
Māt
MATHURA
Hāthras
Dīdwāna
Thāna Ghāzi
Dīg
Rīngus
Nagar
Sadābād
Mustafābād
Manoharpur
Kuchāman
Kishangarh
Sāmod
Rājgarh
BHARATPUR
AGRA
Firozābād
NORTHERN RAILWAY
Beās
Chenāb
Sutlej
Jamuna
Ganga
Markanda
Tehri
DASHT
34°

At 9:00 a.m. we are ready to leave for the trip to Chandigarh in the Punjab on a bright sunny morning. We go by the old secretariat buildings and out on a broad highway. Many people are along the road, especially near the food stores.

I see a good deal of wasteland, partly from brick work and poor drainage with salt, and partly for institutional reasons. The crops are gram, wheat, wheat plus mustard, and some pigeon peas. Near the 8-mile stone the soil is nearly level, clayey, and salty. Besides the food crops there are small fields of sugarcane.

About 10:00 we enter Punjab State and stop for a moment in the village of Morthel. (K-2668; K-2669; K-2670)

As we go on there are some very low sandy swells in the plain and much wasteland. The crops look rather poor. Most of the way the road has an unnecessarily wide right-of-way with wide shallow ditches, commonly a bit salty. Yet elsewhere there are no ditches at all and the flat soil is a bit wet and salty. Then we pass somewhat better drained smooth soil with food crops and sugarcane. Much of the cane has seed stalks. Cane harvest is just beginning. (Milestone 40).

Much soil here has been ruined by both old and new brick making. At least this part of the road goes through country like that traveled north of Delhi in early January 1958, except that I see no hill villages. The Yamuna River is a bit to the east of us. At milestone 51 the soil is still fairly well drained and there are many brickyards.

February 1

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K-2668. February 1, 1959. Morthel.
Village street.

K-2668. February 1, 1959. Mortbel.
Village street.

K-2669. February 1, 1959. Morthel.
Close view of food shop.

K-2670. February 1, 1959. Morthel.
Some villagers seated on charpai.

K-2669. February 1, 1959. Mortlel.
Close view of food shop.

K-2670. February 1, 1959. Mortlel.
Some villagers seated on charpai.

We pass Panipat (Panipar on the road map). This is a market town with some industry - said to be pickles. The pattern of soils and crops continues beyond milestone 62. Then we come to Gharaunda, a police station. I can guess that the soil is fairly well drained fine sandy loam. We have the same food crops and some fields of sugarcane. The number of trees increases and these include a few mangoes. We pass a State orphanage of Punjab under construction. There are still large areas of bushy, overgrazed wasteland, perhaps common land.

We come to Karnal. It is said this town has grown from 10,000 to 100,000 with refugees since partition. Still it doesn't look too bad. There are many people in the shops. I am told that much Urdu is spoken from here north.

At 11:30 we come to the National Dairy Research Institute under the Center Ministry of Food and Agriculture. At first we are told there are 1,800 acres of land of which 1,000 is to be cultivated, mainly to feed 1,000 cattle. Besides buffaloes they have three breeds of milk cows: (1) Tharparker (white); (2) Sindhi (dark red); and (3) Sahiwal (red). They also have a dual purpose breed for work and milk called Hariana; and the Murrah breed of buffalo with curled horns.

They also train people here. Now they admit 20 students per year and will soon have space for a total of 300.

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We are told that they have a difficult problem to produce their fodder crops. The flat soil has a watertable at 5 to 14 feet. They use canal water for irrigation but drainage is quite inadequate. Some fields are covered with water for two or three months during the monsoon and after. Much of it is waterlogged now. I am told that they have salty soils subject to erosion. (Added later: These soils have but little salt and no erosion; but they may be high in exchangeable sodium.) They complain that it is difficult to get machinery and even harder to get good seed, especially of maize and sorghum.

They grow maize, sorghum, and cowpeas in summer and berseem (Egyptian clover) in the winter. They are also trying lucerne, oats, paragrass, and Rhodes grass.

From the canal they get water for 8 days in 24 days; thus there are 16 days without water. But I shouldn't think this would make any great difficulty with proper management. The rainfall is about 30 inches, mostly in summer. They sow maize from February 15 to June 30, or to July 15 on sandy soils.

I meet Dr. W. L. Slatter of the Ohio State team of TCM. Although a dairy technologist, he needs to give most of his attention to drainage! He points out their extremely difficult administrative problems because the station, the drainage work, the irrigation, and the highway construction each come under widely separated agencies. He says that the controlling officers in Delhi have no understanding of the job here. We are told that this severe drainage problem limits agriculture over a wide area here, not just on this farm.

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At one time the British had a military installation here and a dairy farm. The old drains were allowed to fill up since then and to be blocked by road construction. With a deeper outlet to a channel to the east they could have plenty of fall; but this would involve a new highway bridge. They are remaking the ditches as deeply as possible (K-2671). These can take care of the surface water but they should be deeper to do a good job of internal soil drainage and to remove all the salts. The lower soil seems to be a fairly heavy fine sandy loam and probably has fair to good hydraulic conductivity. The soil is already nearly level so it would not be difficult to work out a good system for both irrigation and drainage.

We drive onto a waterlogged area that is practically useless for crops (K-2672). The surface may have been removed for bricks but there is no way to tell now. The lower soil is a silty fine sandy loam to silt. This soil has little salt. The pH of all the soils is said to be about 7.0. The area needs only drainage to produce a first-class soil. This would require a deep ditch and quarter drains somewhere between 100 to 300 feet. This silty material may have a low hydraulic conductivity.

We drive over some more of this ill-drained soil (K-2673) and I see them taking off a poor crop of berseem with hand sickles (K-2674; K-2960). With proper drainage and some phosphate one could expect 12 to 18 tons of lucerne. What a pity! And I suppose there are several millions of acres like this in the Ganges Plain.

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K-2671. February 1, 1959. Dairy Institute Farm, Karnal.
A remade drainage ditch on Dairy Institute Farm.

K-2672. February 1, 1959. Dairy Institute Farm, Karnal.
Waterlogged area that would be excellent soil with drainage.

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K-2673. February 1, 1959. Dairy Institute Farm, Karnal
Fishermen near a pond along the railroad.

K-2674. February 1, 1959. Dairy Institute Farm, Karnal.
Harvesting a poor crop of berseem on soil that would be first class with drainage.

K-2673. February 1, 1959. Dairy Institute Farm, Karnal
Fishermen near a pond along the railroad.

K-2674. February 1, 1959. Dairy Institute Farm, Karnal.
Harvesting a poor crop of berseem on soil that
would be first class with drainage.

K-2960. February 1, 1959. Dairy Institute Farm, Karnal. Harvesting a poor crop of berseem on soil that would be first class with drainage.

K-2960. February 1, 1959. Dairy Institute Farm, Karnal.
Harvesting a poor crop of berseem on soil that would
be first class with drainage.

Here the manure from the cow barns is unnecessarily composted before spreading on the fields, which must result in great losses of nitrogen and some of potash.

We go back to the headquarters and eat our box lunches in the warm sun. After a bit of chit-chat we go out to look at the animals in the pens and stalls (K-2675). They have some nice ones, as I hope my photos will testify. (K-2676; K-2961) They are stall fed. (K-2677) The cows are fed mainly green fodder and silage along with a mixed concentrate of cake, maize, gram, and other grains. (K-2678) Each cow gets a pound of this for each three pounds of milk. One Tharparkar gives 48 pounds of milk daily. (K-2679)

Of course, few if any villagers approach the rations used here; but the people here insist the animals will have the same relative production on the poor village diet. I wonder.

I am told here that fresh dairy cows are brought into cities like Delhi and Bombay and are then slaughtered when they become dry. The officials know this goes on but say nothing about it. They also tell me that lots of vegetarians eat meat on the sly. One man tells me that he is a vegetarian and serves no meat in the home. But his sons and daughters eat meat away from home. Apparently it is not discussed - something like smoking behind the barn.

In a small laboratory they explain their scheme for artificial insemination. This is a free service from this headquarters. In many other places this free service is financed one-half by the Center and one-half by the State. At first there was religious

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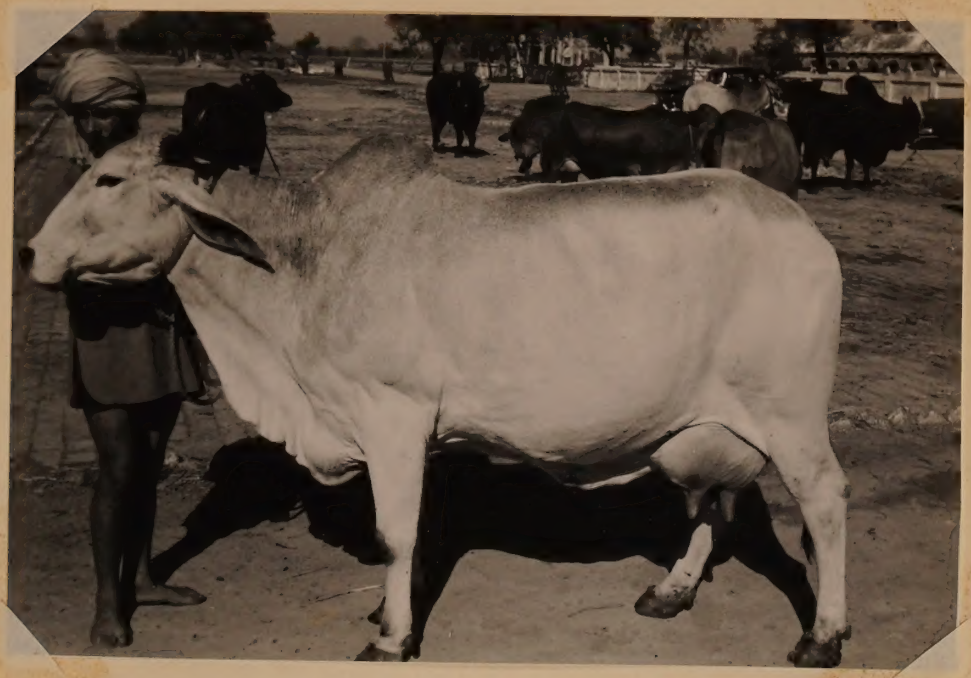
K-2675. February 1, 1959. Dairy Institute Farm, Karnal. Buffalo at the barns.



K-2676. February 1, 1959. Dairy Institute Farm, Karnal. Tharparkar cow said to give 48 pounds of milk daily - the top for the herd.

K-2675. February 1, 1959. Dairy Institute Farm, Karnal.
Buffalo at the barns.

K-2676. February 1, 1959. Dairy Institute Farm, Karnal.
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K-2961. February 1, 1959. Dairy Institute Farm, Karnal.
Excellent Tharparkar bull.

K-2677. February 1, 1959. Dairy Institute Farm, Karnal.
Tharparkar cows in stall.

K-2678. February 1, 1959. Dairy Institute Farm, Karnal.
Feed lot with soiling crop.

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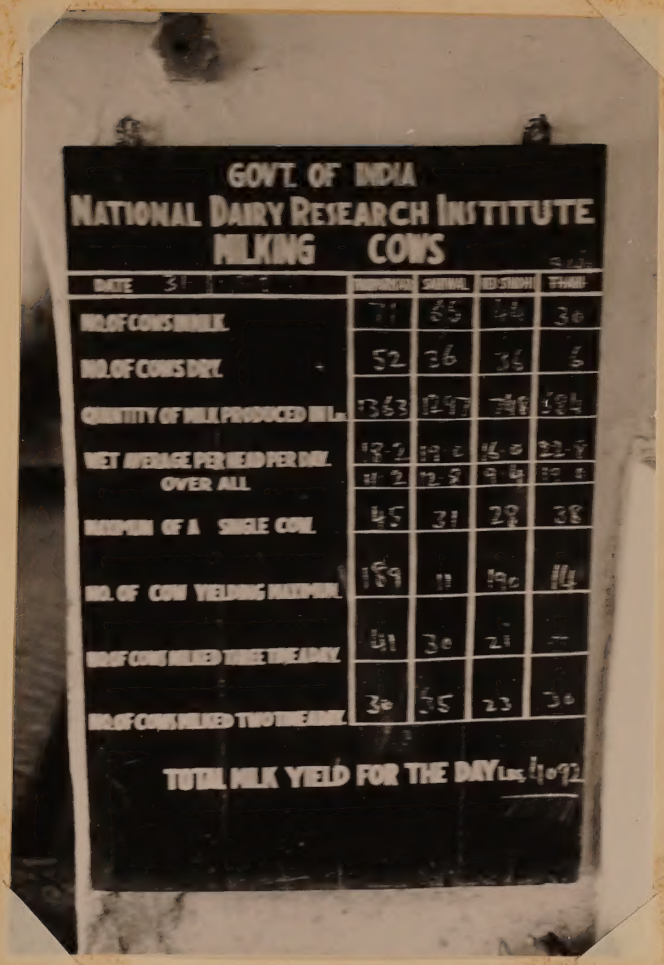

K-2679. February 1, 1959. Dairy Institute Farm, Karnal. Milk yield records in dairy barn.

opposition; but with the demonstration of better animals, more villages use the method. They only go into villages that agree to castrate all the bulls and they breed only the good cows. (Added later: But the operation is not carried out on some until they are 12 to 18 months old!) Most cows are bred in April and May and most buffaloes in December and January. They get about 60 percent conception with cows and a bit less with buffaloes.

I look at the feed grinder, which is operated by a steam engine. Their coal here costs Rs 3 for 40 kilograms.

We leave the Dairy Institute at 3:10 p.m. and go on north to Nilokheri, which is a training institute for both Community Development and Extension. Several, including Superintendent B. S. Mahngar, meet us. He says that there are 68 training centes for village-level workers. Here they expect to offer a three-month course for the teachers in the training centers. This will be under the Ministry of Food and Agriculture. In addition, they will have village-level workers from nearby for three months to give them a refresher course and as practice for the teachers. This is the first such institute and three more are planned. We are shown the class rooms and dormitories but rumors from Delhi suggest that the scheme may not be carried out as the local people expect. I am told that the training for teachers is to be carried on in English and that for the village-level workers in the local language.

I am quite well impressed with the engineer on the staff and his shop. He is teaching people to make small, improved tools for plowing, and the like; and the shop tools for making these implements. Then

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too, he is making some of his own design. Any of them can be made by the village blacksmith with training.

We sit down for tea. The engineer tells me that he had an instructive visit to Japan. He also speaks of a new machine in China that automatically transplants the rice seedlings without any hand labor. Yet except for this engineer, I am a bit suspicious of the set-up here for no very good reason.

We are in the cars at 4:45 and hurry on. We pass Pipli. Here there is much unused soil, partly in commons and partly wet. I see the usual food crops and some sugarcane. The amount of trees and other woody growth gradually increases. I see some sheep.

We come to Ambala and have a long wait at the railway crossing. Now it is 5:50 and the dusk gathers rapidly, yet we see the mountains in the distance. As we go on the soil is better drained and I see less waste except for areas of brick diggings.

We cross the Ghagar River. The flood plain is lower here and ill drained. Dark now.

We reach the Mount View Hotel at Chandigarh about 6:45. Dinner, notes, and to bed.

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February 2

Last night was cold; but this is a sunny morning. I am told that the elevation of the city is 1,000 to 1,100 feet and the rainfall 40 inches.

At nine we leave for a short tour. First I meed Dr. Arjan Singh, Director of Agriculture in the Punjab Ministry of Agriculture, who was with us yesterday. He introduces part of the staff. We meet Mr. Guy Hummon of TCM for extension advice in this State. I meet two young men of the Soil Conservation Research Station, Mr. Ivan Erasmus, in charge, and Mr. D. S. Kang, a geographer, who is his assistant. I also meet briefly Mr. D. C. Kaith, Chief Conservator of Forests. He says he spent a year in the United States.

The city is entirely planned. Sectors have been established for various classes of residences and other uses. These have schools and parks situated to avoid main street crossings. The city is only in building and large open spaces are common. Now the population is at 20,000 but they expect 200,000. We see rather nice flat-topped brick and stone houses and apartments in the modern tropical style. We stop momentarily to look at the Sukhna River. The Patiala River is on the other side of town. On the first river I am told they have built a storage dam to insure a water supply for Rs 8 lakhs, but not one rupee for erosion control to preserve its life!

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We stop to look at a new concrete building for the high court made in the modern French style with ramps. I glance into one court room that has a huge mural-like hanging in the most modern symbolistic style. It is said that M. le Corbusier is the chief architect for this new city. A central board has control of all planning. Homes can be built privately but they must conform precisely to the plan. I am told that they have 13 categories of houses and apartments allocated by rank. The chief minister and the high justice get number 1. The ordinary ministers have number 2, and so down to number 13 for the peons. The houses for the highest class are far too elaborate and costly; and even the lowest ones are too expensive for the common laborer, especially since he cannot keep a cow. So we see the wretched little huts made from scraps near the edges of the city. This whole business smacks of the great contrasts that Nehru and the others promised the new democracy would avoid. Yet here we see it being promoted by the State government itself. It is the kind of thing that breeds either Communism or the extreme right.

We stop for a moment at the new Engineering College, which is also too elaborate. I take a quick look into the soil mechanics laboratory. On the way to the secretariat we pass the new public library. I am told that government officials with a salary of Rs 300 or more per month do not need to purchase a membership but poorer people do!

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We then go to the office of the Secretary of Agriculture. (He is the highest administrative officer - a civil servant comparable to deputy minister.) With him are the Director of Agriculture, the Director of Animal Husbandry, the Deputy Director from Community Development, and others.

The Secretary says they are doing all they can to increase agricultural production with the facilities available. They are trying to intensify cultivation and some Rs 9 crores worth of schemes are handled by the Irrigation Department. I ask about shifting cultivation but the Secretary never heard the term before. When explained, he says they do not have any. He asserts the obvious: that he is not an agriculturist.

He gives us a mimeographed summary of the present situation and points out that much of the recent increases in production has resulted from the influx of skilled farmers from the West Punjab after partition. They were given loans and land. The amount of land given a refugee depended in part on the amount of land he had held originally. Generally, the Hindus left more land than they received here.

He says that the law provides a ceiling of 30 standard acres for ordinary farmers and 50 for refugees, provided they held large farms in West Punjab and were allotted 50 acres or more here. (Added later: I saw a well-managed farm of 162 acres later owned by a refugee.) We are told that a standard acre refers to good irrigated soil, much better than average. Tenants who have been on land six years or more are given a chance to buy it at 75 percent of its value.

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Exceptions are made to ceilings for well-cultivated, mechanized farms, for garden colonies, in sheep farming areas, and for orchards. (It seems to me that in the enforcement of these laws there must be opportunity for "influence" and graft. Obviously they have not been fully enforced.) (Added later: Some refugees asked for and received large acreages of unimproved soil, which they could build up to a high state of productivity, and thus now these have farms much greater than 30 standard acres.)

These land problems are handled by the Revenue Department and the agricultural officers are not well informed on the laws or the measures being taken. Yet they are to advise on what is a well-managed farm that should be exempt. They would exempt an efficient irrigated farm producing wheat with yields of 30 maunds (roughly 41 bushels) or better per acre.

We are told that farmers here have a shortage of labor during seeding and harvesting even though it is claimed that they pay up to 4 or 5 rupees per day (which I very much doubt). They give us several reasons why no attempts are made to use the unemployed in Karnal.

The Secretary says that their greatest problem is organization - too much paper work, personnel management, checking, and the like. He says that they have very competent men in the ministry! Research is not linked with the extension work in the field. He believes the whole set-up needs revision.

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It is said that the Community Development blocks now have funds for small loans, seeds, minor irrigation works, and the like; but funds for use on the ground are lacking. Actually the funds used for agriculture are low and the village-level workers are not spending anything like 75 percent of their time on agriculture. The Secretary says that "pure extension" will not work.

In the last seven years fertilizer use has increased from 4,000 to 40,000 tons. They want to increase it more. Much is sold on credit collected with land revenues. He says that most fertilizer is distributed by cooperative societies. It seems that the distributors are allowed a maximum of 30 percent mark-up for transport, storage, and other handling charges. He thinks it is wrong that the Department of Agriculture must check all their records. This takes 14 employees. I agree with his thought of simply letting the cooperatives have the 30 percent and do the job. Apparently these societies are not true cooperatives. Only the more wealthy farmers in the village belong. The Secretary says that actually they are not much different from joint-stock companies out to make profits. Both members and non-members in the village get government permits for fertilizer, show them to the cooperative office, and are given the fertilizer.

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I get a better opinion of the Secretary as he talks. He stresses that too much of the extension work is very general; and what is really needed is the working out of a specific cropping system or farm plan with each cultivator. He points out further that traditionally the cultivator looks primarily to the district commissioner as the government. He says that agricultural extension has not done well because the village-level workers are so ill-informed on agriculture that they have little to offer the good cultivators of the Punjab.

A deputy from Community Development says that the village-level workers have been directed to work out a farm plan with each cultivator. But we show him that this is obviously impossible because of the large number of families involved. He would have to make three a day for better than a year. Then it is admitted that so much money is allotted to each block for other purposes that probably the village-level worker doesn't give over 10 percent of his time to agriculture, not 75 percent as directed from Delhi.

But the Secretary insists that even though the other programs were suspended for a while, as I suggest, the village-level workers do not know enough to help the farmers much. He speaks of the poor job being done on over 200 seed farms. (I see this irritates our U. S. Extension people who insist that the village-level workers are given the blame for failures of the experts at the block level.)

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Some point out that the village-level workers did well with the cotton variety program. The Secretary admits this and says that several programs had gone fairly well; he is trying to tell us frankly of the failures. And they did get the wrong cotton varieties in some places. Hummon points out that the block extension people did very well with the maize demonstrations although every village-level worker failed. (I think there is no question but what the U. S. Extension people are claiming far too much for Extension in the United States and promising far more for Extension in India than it can deliver.)

The Secretary asserts that the Department of Agriculture looks upon Community Development as something outside. Many of the agricultural officers, and officers in other departments, take the view that Community Development is trying to "take over" their functions. Also the Community Development block directors do not feel obligated to agriculture. As a result, agricultural officers at the district level are inclined to support their men <u>outside</u> the blocks more since they report wholly to them. Then too, it is easier to show the District Commissioner, who makes hurried trips to the villages, roads and buildings than it is extension work. Also these construction projects are one-half subsidized. So the shrewd villager feels that he is getting a very good deal on the construction work.

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I certainly appreciate the Secretary's frankness. He is a typical British-trained District Commissioner who was recently promoted. We leave for our hotel about 1:00.

After lunch at 2:15 we leave for the Soil Conservation Research Station with Dr. Arjan Singh. He says that he agrees with my suggestion to reduce these other funds allotted to the blocks for a few years so that the village-level workers and block directors can concentrate on agriculture. As we drive out of the city I see wheat, rape, herded sheep, sugarcane, mangoes, and a shrubby plant, Ipomea cornea, used for composting. Yesterday I saw this shrub on many field boundaries.

We pass Mani Majra and turn east on a side road. I see some sisal plants, used mainly here for erosion control, bananas, vegetables, and date palms that have no edible fruits. We come to a group of Hindu temples of great interest. I hope my kodachromes turn out.

We transfer to jeeps for the difficult road to the Station.

The Station has 786 acres, mostly very hilly soils from strongly dissected colluvium. The soils are yellowish-brown fine sandy loams without much clay accumulation in the B. The pH of the soil is said be about 8.0 to 8.2, which seems high. (I should not want to trust these results without a check.) They have some gently sloping soil on a high terrace where they try out crop plants with and without superphosphate, grasses, and other plants for erosion control. One grass is good for both soil stabilization and paper.

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Pennisetum purpureum (elephant grass) does very well here if irrigated. It is too bad we must hurry so. They have an old fashioned soil map in 5 classes - 3 suitable for crops and 2 not suitable. They recommend against grazing soil of more than 25 percent slope. (I note here that pigeon peas are called "arhar.") It is a pity we have so little time. The work here began only in 1957.

They have the usual objectives for soil and water control plus the trial of legumes for the monsoon period. They are trying contour bunds based on the Bombay designs for about the first time in this part of India (K-2680; K-2681). The best formula for the vertical interval is S (percent slope) plus 2. On a 2 percent slope this gives horizontal distances of about 200 feet. The monsoon rains penetrate about 60 inches with the bunds and less than 30 inches in the hills.

We take a very hurried trip to the hills. Again I am amazed at the growth of grass and shrubs with only two years of guarding. They allow no grazing but auction off the cutting rights in autumn. The first year before treatment they received Rs 150, the second year about Rs 1,000, and last year Rs 1,500. They are trying to build small dams of earth to control the chos (or arroyos).

In the steep areas I see soft sandstone tilted to a nearly vertical position. I doubt that this is country rock. More likely it was formed after the colluvium was laid down. But I do not know. They even have small bunds with spurs for controlling water in chos within the very hilly areas. (K-2682)

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K-2680. February 2, 1959. Soil Conservation Station, Chandigarh. Contour bunds on fine sandy loam soil on terrace of moderate age with 2 percent slope.

K-2681. February 2, 1959. Soil Conservation Station, Chandigarh. Measuring device for soil wash and runoff at end of bund for 2.35 acres.

K-2680. February 2, 1959. Soil Conservation Station, Chandigarh. Contour bunds on fine sandy loam soil on terrace of moderate age with 2 percent slope.

K-2681. February 2, 1959. Soil Conservation Station, Chandigarh. Measuring device for soil wash and runoff at end of bund for 2.35 acres.

K-2682. February 2, 1959. Soil Conservation Station, Chandigarh. Steep areas of rather permeable sandy soil. Note tilted soft sandstone, which is probably formed from old colluvium (?). Note bunds in lowland for holding water. Guarded from grazing only two years.

K-2682. February 2, 1959. Soil Conservation Station, Chandigarh. Steep areas of rather permeable sandy soil. Note tilted soft sandstone, which is probably formed from old colluvium (?). Note bunds in lowland for holding water. Guarded from grazing only two years.

They have some measuring devices at the ends of the bunds on the terrace and hope to install some for the work in the hills. They also have measuring devices for soils and water on the lower margins of two large plots on a gentle slope.

On the whole I am well impressed with Ivan Erasmus and his work.

About 4:00 p.m. we return in the jeeps over the bad road and change to the cars and are taken to the Panjore Gardens. These were built in the 17th century by the moguls and were recently taken over by the State from a local maharaja. They have nice waterfalls, pools, gardens, and reception rooms. Many of the shrubs and trees are chlorotic I suspect from one or more trace-element deficiencies.

After tea we return to the hotel about 5:30, dress, and work on the notes for the day. At 7:30 we go for dinner with the whole group chez Hummon. The house is well heated and the dinner is very good. My host promises to have a model Punjab plow made for me. I do not know about his work in Extension but he certainly is a good brass collector in the usual TCM tradition.

We are back at the hotel about 10:15, work for a while, and go to bed.

They have some measuring devices at the ends of the bunds on the terrace and hope to install some for the work in the hills. They also have measuring devices for soils and water on the lower margins of two large plots on a gentle slope.

On the whole I am well impressed with Ivan Erasmus and his work.

About 4:00 p.m. we return in the jeeps over the bad road and change to the cars and are taken to the Panjore Gardens. These were built in the 17th century by the moguls and were recently taken over by the State from a local maharaja. They have nice waterfalls, pools, gardens, and reception rooms. Many of the shrubs and trees are chlorotic I suspect from one or more trace-element deficiencies.

After tea we return to the hotel about 5:30, dress, and work on the notes for the day. At 7:30 we go for dinner with the whole group chez Hammon. The house is well heated and the dinner is very good. My host promises to have a model Punjab plow made for me. I do not know about his work in Extension but he certainly is a good brass collector in the usual TCM tradition.

We are back at the hotel about 10:15, work for a while, and go to bed.

February 3

This is a gray morning. About 9:00 we leave for a trip to Bhakra Dam. We pass some fair villages and I see wheat, mangoes, sugarcane, and gram. We pass Kaurali -a market town. We meet a string of blanketed bullocks going to market. As we go on northward I see the same crops and, of course, these ruinous brickyards. We pass the main irrigation canal from Bhakra, said to be 108 miles long. It is brick lined. Where the road grade is high the soil is ruined on either side of the road up to 150 feet or so with irregular borrow pits.

We pass Rupar and go into dissected relicts of old higher terraces and then are back on the plain. We pass a market along the road mainly for bullocks (K-2683).

We recross the main canal and drive along it where it is lined with concrete. Then we pass into dissected old terraces with secondary sandstone layers and gravel layers. Places look like badlands, apparently protected recently from grazing. We pass over a few nearly dry braided streams and both small and large low terraces with soils used for the usual crops already seen.

We pass near the Kotala Power House and then pass Kiradpur. Off to the side of the road we see several temples but one main one. This is very important to the Sikhs who come here in large numbers in March.

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K-2683. February 3, 1959. North of Chandigarh.
Bullocks at the market.

K.2683. February 3, 1959. North of Chandigarh.
Bullocks at the market.

A little further on we turn off the main road on a well-drained smooth terrace and come to the Gangewal Power House fed from Nangal Dam. We are told that they are now producing 48,000 kw. from two Westinghouse generators. They get an equal amount from the power station downstream. They can have 96,000 here with one new generator. We are told here that when the Bhakar Dam is completed they will have 9 new units, each at 96,000. They expect to have a fertilizer plant for calcium ammonium nitrate at Nangal that will use some 300,000 kw. Everything is very clean and neat.

We drive back to the main road and on north over a smooth terrace with well drained yellowish-brown fine sandy loam (?). Since we are near the mountains there is much wood working in the villages and a few charcoal kilns. As we go on the sandy terrace gives way to a more gravelly and cobbly one. Here there are many buildings, material yards, and the like. We go on toward the hills.

We stop at a nice rest house for a long time and eat our box lunches. About 1:00 p.m. we leave for Bhakra Dam through hills of strongly dissected soft light gray sandstone. In places these hills are capped with cobbly alluvium.

We come to the dam on the Sutlej River. It will be 740 feet high, counting the 200 feet or more for footings. Two flumes 50 feet in diameter were made for taking out the water around the site through the rocks back of a low coffer dam. (K-2684; K-2685)

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K-2684. February 3, 1959. Bhakra Dam.
General View.

K-2685. February 3, 1959. Bhakra Dam.
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K-2684. February 3, 1959. Bhakra Dam.
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K-2685. February 3, 1959. Bhakra Dam.
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It is said that this project will cost about $340,000,000. It is financed mainly from a loan by the International Bank. The structure will be used for power, irrigation, flood control, and fish. The reservoir is said to provide 7,000,000 acre-feet of storage. Five to six million of this will be used for irrigation on 10,000,000 acres, about one-half in the Punjab and one-half in Rajasthan. I am afraid this means more waterlogging on the good soils of the Punjab. Now I am told that the whole system will produce 10 lakhs of kilowatts of which one-half will be firm. Most of this power will come from 10 units of 90,000 each at this place.

We look at the installations within the power house where they are preparing for the generators, and walk for a way in one of the galleries into the dam itself. Then we go back to the cars and drive up near the top of the low mountain above the dam. The rocks are mostly sedimentaries - soft sandstone, weak shales, hard limestone, and some weakly metamorphosed sandstone. The strata are sharply tilted and the shale is reduced to clay. I can see that it must have been a big job to get solid footings. The conveyors and machinery used resemble those I saw at Grand Coulee in the thirties.

We return to Nangal Dam also on the Sutlej River and stop for some to sight-see.

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Then we drive back to Kiradpur and turn off the road to see the Sikh temple. We take off our shoes and go into the temple where the priest explains the stories back of several of their symbols. While we are there both men and women come into the central place, kneel, and throw money on the low platform on which the priest stands.

About 5:00 p.m. we leave for Chandigarh. Now there is quite a bit of wind and the fines blow out of the beds of the braided streams. I believe this accounts for the low stabilized sand ridges I had seen in the great plain near Delhi, even though the old stream beds themselves have long since been filled. (K-2686)

We are back at the hotel about 6:30, change, and go for a cocktail hour chez Dr. Arjan Singh. A little after 8:00 we have dinner, then notes, and to bed.

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K-2686. February 3, 1959. North of Chandigarh.
Camels along the road in evening.

K-2666. February 3, 1959. North of Chandigarh.
Camels along the road in evening.

February 4

This is a cool, windy, rainy morning. At 9:05 we leave the city along the same road as yesterday. After a little way we turn west of northwest on the main road to Ludhiana. We drive along a well-drained terrace with slightly undulating cover sands blown out of the braided streams.

We pass Morinda, a market town on the railway. A little way beyond we cross the main canal.

We pass several areas of quite deep cover sands. (K-2687; K-2688) Some near the road even have low dunes with active blowouts. Part of the trouble along here is that bushes, and earth thrown from the highway, have made small barriers that catch more sand, which is thrown just over the edge of the pavement to increase the ridges, which gather more sand, and so on. Some special stabilizing grasses are needed to hold these blowouts. (K-2689)

We stop for a moment at Kohara and meet Professor R. E. Gray, poultry specialist with the Ohio State team. We then walk around in this village of about 1,000 people. It seems to be much better than most, certainly better than any I have seen before in this part of India. The very narrow streets are paved with brick and have five-inch side gutters. (K-2690)

We are taken into the house of the head man. The walls are brick and the floors are earthen. We are shown a tiny hand-operated cotton gin. Obviously we have been expected: the village is cleaned up and most are in their holiday clothes.

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K-2687. February 4, 1959. West of Chandigarh near Jatana Ocha Village. Dune-like cover sand.

K-2688. February 4, 1959. West of Chandigarh near Jatana Ocha Village. Children gather by the car.

K-2647. February 4, 1959. West of Chandigarh near Jatana Ocha Village.
Dune-like cover sand.

K-2688. February 4, 1959. West of Chandigarh near Jatana
Ocha Village. Children gather by the car.

K-2689. February 4, 1959. Labarchahal, west of Chandigarh.
Active low dunes in cover sand.

K-2689. February 4, 1959. Labarchabal, west of Chandigarh.
Active low dunes in cover sand.

K-2690. February 4, 1959. Kohara.
Street in village.

K-2691. February 4, 1959. Kohara.
Courtyard with spinning wheel.

K-2690. February 4, 1959. Kobara.
Street in village.

K-2691. February 4, 1959. Kobara.
Courtyard with spinning wheel.

We are shown some spinning wheels and weaving. (K-2691) I look at bullocks and camels in the stable. I am told that a good bullock costs about Rs 400. He will work for 6 to 10 years. A camel costs about Rs 500 but camels are hard to handle in winter.

Mr. Jaswant Singh, the Block extension agriculturist, goes with me. I find it a bit hard to communicate with him. We are told that the land in this village has been reconsolidated. In one area near the edge of the village each family has its own manure pit. We go out a little way into the fields with yellowish-brown light fine sandy loam. The crops show nitrogen deficiency, especially the wheat. I am told that the villagers lack money for fertilizer. (Yet I was told a few moments ago that a villager recently spent Rs 1,500 on his daughter's wedding!) They have only six acres per family and the extension officer says they should have 30.

We are then taken to a nearby farm just outside the village held jointly by four brothers. They have a total of 45 acres, some of which are not attached directly to the headquarters. This is supposed to be a good dairy farm. They have a herd of 27 buffaloes of which 18 are now being milked. They have an average daily production of 30 pounds per animal (maximum 42 pounds) with 7 to 8 percent butterfat. They use fertilizer and manure and get 45 to 50 bushels of wheat per acre. They use 20 pounds of P_2O_5 as superphosphate and 40 pounds of nitrogen as ammonium sulphate. Besides the manure, the liquid manure is saved in a pit and added to the irrigation water.

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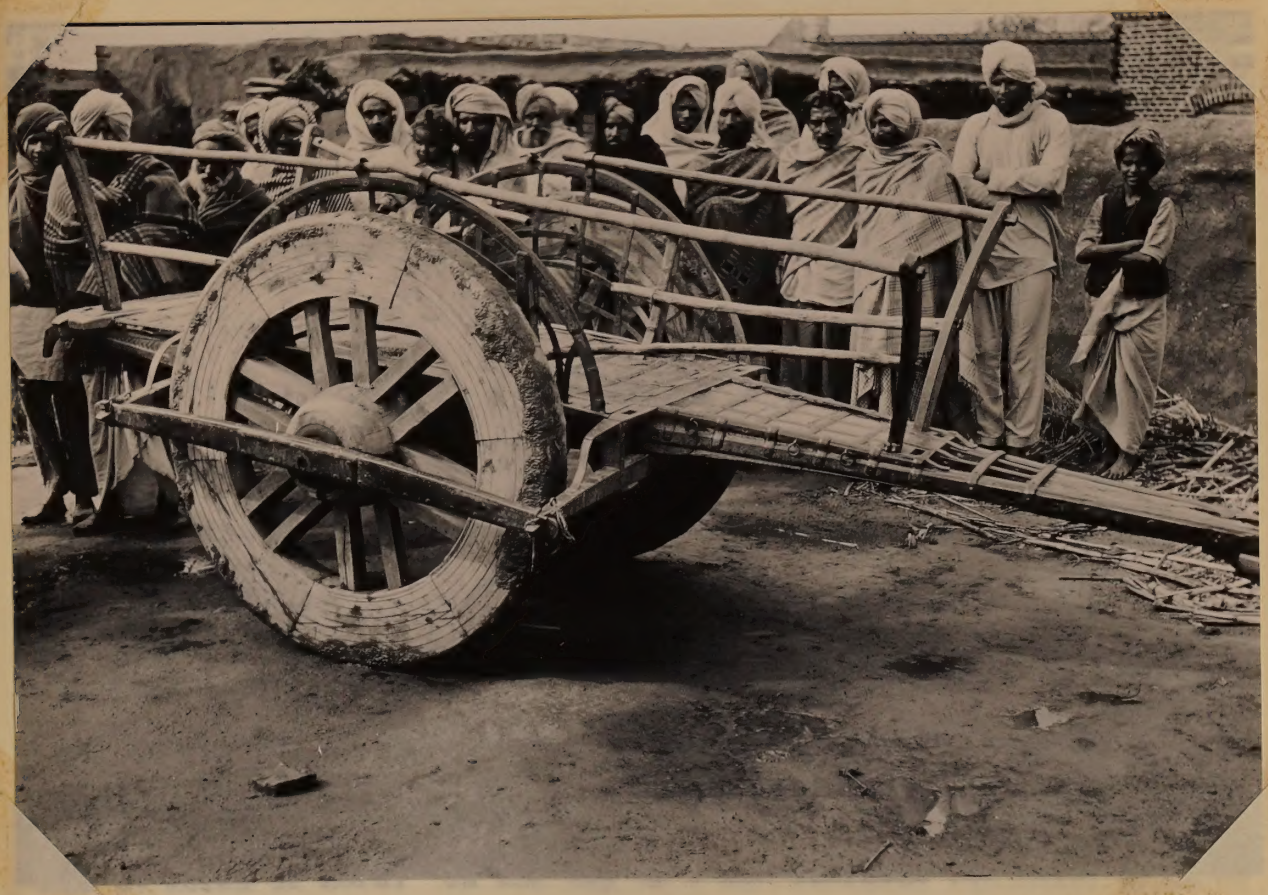

K-2962. February 4, 1959. Kohara. A good bullock cart without steel rims but with iron straps on the bed. (And villagers).

K-2962. February 4, 1959. Kohara. A good bullock cart without steel rims but with iron straps on the bed. (And villagers).

I see a diesel engine for pumping water for irrigation and for cutting fodder. I see some nice lucerne. They have a small orchard of lemons and malta oranges. The trees are chlorotic - Fe, Zn, Mn, or what?

We now hurry to a 4-H club poultry enterprise. We are told that some birds are diseased and that egg yields are low mainly because of unbalanced rations. They hope to have a scheme in operation soon for the State to furnish at cost special feed mixtures that can be mixed with the local feed for good rations. On the local feeds alone the American-type hens give 50 eggs per year and deshi (or local) give 25. With good rations the deshi go to 50 and the American breeds to 200 or more. Some special effort is given by one officer in this block to youth projects with poultry and now they have 27 of them.

We next go to the Jogiana Kanganwal Cooperative Garden Colony. On the way we see a cluster of poor houses for the Harijans. It is said these will be demolished and replaced by a model village in a few weeks. The Colony Farm has 35 families. It is said that each has 14 acres or more. On the way in I see radishes for seed, gram, wheat, lucerne, sugarcane, and citrus. I see stacks of old cotton stalks used for fuel. They produce hybrid maize seed. Now I am told they have 700 acres of field crops but I think that part of this is supposed to go into horticulture eventually.

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We are taken to see a field with citrus and wheat. The wheat gets 50 pounds of N, 30 pounds of P_2O_5, and 30 pounds of K_2O per acre and they expect 60 bushels per acre. The citrus is chlorotic. I am told that the soil chemist at the college says that this is due to excess salts and that he has tried sprays of trace elements alone and in combination without effect. Obviously on this well drained sandy soil with the monsoon rain and irrigation it cannot be salts. (Added later: About 5:00 this afternoon I saw the soil chemist who impressed me well. He said he laid out experiments and showed that the chlorosis was corrected with sprays of iron and zinc together! Of course, the addition of P and N for the wheat tendsto worsen the iron deficiency for citrus.) They claim here to use about 12 irrigations of around one to three inches each.

We are taken to see the stored hybrid maize. They get about 25 bushels of good seed per acre, which is sold to the government at Rs 40 per 82 pounds. They raise also seed of radish, carrot, and onion. I see some buffalo for milk.

We then take our box lunches to the roof of the house of the Secretary of the Colony - Capt. Rattan Singh. He is obviously an unusual operator - competent and enthusiastic. After lunch we have a general discussion with Block officers, the Secretary of the Colony, and 3 or 4 farmers. This area was assigned to refugees from West Punjab who were skilled farmers. They used bulldozers to level the hummocky cover sands which are said to be more than 5 feet deep here. They have here good tube wells and no waterlogging

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of the soil. They want these colonies to produce fruit. Altogether there are 21,000 acres in such colonies. Each farmer normally has a unit of 20 acres but some joint holdings are larger. They have standardized their crops and varieties for efficient marketing. The Department of Agriculture gave this Colony the opportunity to grow hybrid maize in isolation. This Colony was so successful that others now want to grow maize and other seeds.

The Punjab has 1,000,000 acres of maize and the Department now has seed for 25,000 acres of hybrid maize. Now the average yields are about 16 maunds (roughly 23 bushels) per acre. With good hybrids, fertilizer, and proper water management, yields can be greatly stepped up. They tell us that they irrigate their maize 4 or 5 times with 24,000 gallons per acre (roughly one inch); and they can irrigate from 14 to 30 acres from one well.

Besides bullock teams they have 11 wheel tractors.

Everybody belongs to the cooperative, financed by membership shares at Rs 1,000. They now have monthly luncheon meetings as a kind of club at one another's home. In the discussions they find ways to cooperate further. They got cooperatively a spray pump, the use of which doubled cotton yields. Now all buying and selling is done through the cooperative, which is managed by a 9-man committee. Each committeeman looks after one crop or set of crops. The nearby Harijans partly work for the colony members at a daily wage of RS 2¼ and the cooperative sells them food at reduced prices. Others of the Harijans are drivers, shoemakers, and the like.

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They set aside a small area for the young people to grow crops provided they did all the work. Their first crop, gram, yielded better than average so they had money for a tube well and some more to spend. They are especially anxious to help maintain the machines.

People here are reducing the cost of marriages. They have agreed to stay only one day and to have one meal. What about the future? They claim they can handle the normal increase in population through greater intensity for at least another generation.

I ask the Block officer how can people of this general area be brought to realize the seriousness of waterlogging. He claims that they do now and are making ditches! (But, of course, few, if any, are removing more than surface water.)

This is certainly an unusual set-up. It is difficult to know how much has been contributed by the extension people. Or did they mostly find this group?

We leave at 2:00 p.m. to visit the new Government Agriculture College at Ludhiana.

Along the road I see strips of unused land belonging to the government. Certainly some one should have it for cultivation. We soon enter the city where bicycles, sewing machines, and knitted garments are made. The population is said to be over 2 lakhs.

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Ap.VI

We come to the college at 2:25 p.m. and are immediately seated at green-cloth covered tables placed in the form of a large square. The principal is away and the plant pathologist is in the chair. He first speaks of the terror of partition - plunder, arson, and murder. But when the Bhakra Dam is completed the Punjab will again become the granary of India. Through partition they lost their agricultural college so they are building this one here. He ends by emphasizing the urgent need of population control. Then he calls each specialist to speak.

1. Cotton and oil seeds. Because of the introduced longer staple American cottons they now have nearly enough of this but they need to grow the extra long staple, which is now imported into India. They have 15 lakhs of acres in cotton, of which 9 lakhs are of American sorts. In recent years they have increased yields from 500 to 900 pounds of seed cotton per acre. They have 2 lakhs of acres of groundnuts and this crop is increasing. It is used mainly for oil. They have just released a new variety - Punjab 1 - that is higher yielding and more disease resistant.

2. Fruit. The Punjab is well suited to fruit and now has 60,000 acres: apples in the hills; apricots and plums in the low hills; and mangoes, mandarins, and sweet oranges on the plain. With more water these last will increase. They have several government gardens for fruit testing, demonstration, and nurseries. They have research subsidized by ICAR (Indian Council of Agricultural Research) but they have difficulties because ICAR demands State facilities that are hard to come by. The third 5-year plan includes more fruit

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stations. Now they can advance loans up to Rs 300 per acre for 17,000 acres. It is said that chlorosis starts at bearing time and may be due to interplanted crops (which I doubt). It is said that some think it due to iron and to excess lime in the soil. Heavy additions of organic matter help.

3. Agriculture chemist. He works on fertilizers for different crops and soils and also on the reclamation of saline and alkali soils. He says that all of his work is severely handicapped by the lack of a soil survey to give him a basis for classifying his results. He says that some 9,000,000 acres of arable land are badly affectd by waterlogging and that 3,000,000 of these are salty. Many of the soils are very high in exchangeable sodium (as high as 90 percent). Some have croûte calcaire. Gypsum, fertilizer, and green manure should be given besides drainage. He has no facilities for research in soil physics or drainage except just a little for surface drainage.

They have 1,000,000 acres of acid soils needing lime. In these the cultivators are poor and erosion is generally active so if lime is to be used subsidies will be required. Also trace elements are needed for these acid soils.

Of the 40,000,000 acres of "normal arable" soils (there are many types and series among these), 99 percent respond to N, 40 percent to P, and 25 percent to K. But these soils also tend to become saline with irrigation.

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The chemist, Dr. Kanwar, says that some chlorosis is due to high water tables, some to bad structure, some to croute calcaire, and some to deficiencies of Fe and Zn. Some citrus responds therefore to Fe and Zn sprays and some does not.

Special measures for erosion control or soil blowing control are needed on 9,000,000 acres.

Soil testing work is just beginning from the help of TCM, but field-plot research and laboratory research are needed for standardizing the tests. Last year they had to collect their own samples, since the cultivators could not do it properly, and they made determinations for available P, N, organic matter, pH, soluble salts, and sometimes K. He says that it is extremely difficult to get any repairs or servicing of the equipment furnished by TCM.

4. Plant protection from insects. So far they have made demonstrations, loaned equipment, and sold chemicals at cost. Now cultivators are sold equipment at one-half cost. They have difficulty getting engines that must come from abroad. Then too, Public Health gets first priority on insecticides and too little is left for agriculture. It is hoped to get the Center to make one foreign contract for machines and insecticides for all of the States. The speaker thinks each district should have an entomologist and a plant pathologist with an officer and six assistants in each block. He hopes this is included in the third 5-year plan.

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6. Bio-chemistry and bacteriology. Some 103 towns cooperate in a scheme for composting. They get 2 lakhs of tons. More could be had from village wastes. Now there is a compost inspector in each block. They hope to increase the yield of compost from one to two tons per head of cattle. (But this will take, I believe, other sources of fuel.)

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10. Agronomy, including dairy husbandry and economics (mostly teaching). The speaker complains that they have only 54 acres for the college farm. In the Punjab 63 percent of the land is now cultivated. By his standards only 40 percent is irrigated and only 10 percent is intensively farmed. The big need is for more intensity with improved seeds, fertilizers, and irrigation. (He is not a good man or he would have mentioned drainage.) Farmers lack money to buy the materials but if they had it the materials would be unavailable for many. He says there is a total of 11 acres of agricultural land per family.

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We have tea and I talk briefly with Dr. J. S. Kanwar, the agricultural chemist and walk into his laboratory. He shows me data on ill-drained soils having over 90 percent exchangeable sodium. Then too, he says some of the wettish soils have excesses of boron. Here he tells me that a spray of iron and zinc did cure the chlorosis of citrus at the "colony" farm we visited today. He says he gets no help from the Center on soil survey, which they need very badly. He gives me a paper on his results of research on trace nutrients. He strikes me as above average as "agricultural chemists" go. But he covers far too wide a field.

We leave the College in heavy rain and are on the way to Chandigarh at 5:20 p.m. Along the road, here and there, we see large flocks of huge vultures. We reach the hotel at 7:10 p.m. Then dinner, notes, and to bed.

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February 5

We leave Chandigarh for Delhi at 8:45 along the same route we came. This promises to be a nice sunny day. A little way out we pass a large area that could be productive with drainage. Besides the usual crops we see a few fields of pigeon peas or arhar. We pass Pipli and come to a village near Karnal about 10:45. I walk over and photograph plowing with a common stick plow where they expect to have paddy following paddy. (K-2692)

We are taken to Butana Village in the Nilokhert Block. This is one of 135 villages in the Block. In 1952 the land of the Block was one-third forest and two-thirds dryland culture. Now it is all cleared and irrigated from tube wells. Formerly the villagers bred cattle and stole cattle from others. Now they are all cultivators.

This village has 900 acres and 400 people. With two other villages they share the panchayat. The head is a young man 30 years old, of this village.

They are now growing mostly wheat and paddy along with gram, sugarcane, cotton, and some hybrid maize. The holdings were scattered but have now been consolidated. Each family has some fruit but I saw precious little. We are told that production has increased 4 to 6 fold during the last 6 years (but certainly not that much per acre or per capita).

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K-2692. February 5, 1959. Near Karnal.
Plowing old paddy land.

K-2693. February 5, 1959. Butana Village near Karnal.
Courtyard.

The Block officers and members of our group discuss and discuss. I somehow lack confidence in the translations of the farmers' statements.

They have a cooperative society of 40 members for credit only. Someone asks the gram sevak what he did during the last three days. He replies that he was ill. Then he is asked, "What did you do the last three days you worked?" "I helped a boy make brown sugar!"

Worst of all, the officers of the Block say there is no drainage problem here. Yet all of the soil we see is ill-drained, which means yields far below potential for everything except paddy.

I leave the group and walk around the village. (K-2693; K-2694; K-2695; K-2696) A high proportion of the women have heavy colored veils. The main streets, mostly 6 to 10 feet wide, are paved with brick and have side gutters. But it must be hard to keep a village clean when the animals and people live all together. In evidence are large piles of cow dung cakes for fuel in all stages of preparation.

In the central council house they have a library, a radio, and a place for meetings.

I notice that the women throw aside the veils except when the men folk in the village can see that they are uncovered.

The village has three wells, one large one for the majority and two others for two classes of Harijans. I look into the large one and notice several sugarcane stalks in the water. The well is about 20 or 25 feet deep. Women drop little buckets over the edge and pull them up with ropes over a pulley. They fill their jars and carry them away on their heads.

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K-2694. February 5, 1959. Butana Village near Karnal. Sugarcane field at margin of village. Berseem in foreground. Wheat left background. Pile of cotton stalks for fuel.

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About 1:00 we go for lunch in a rest house nearby. At about 1:40 we leave for a farm near Panipat.

Here I meet Mr. P. N. Maihra, a highly intelligent individual farmer. Before partition he had a good business in West Punjab as a Ford dealer for 23 years. As a sideline he had a farm. He left during partition with some money and two carpets and got his farm here, an unconsolidated holding of 162 acres. This is intimately associated with a nearby village of 1,700 acres, including his land. The village has about 400 families and around 1,200 persons. The road is very bad to the village so jeeps bring out some of the village farmers. Most of our group talk with these farmers through interpreters from the Block; but I spend most of my time with Mr. Maihra. Although he has less than 10 percent of the land he markets 4 times the paddy, 6 times the cotton, and twice the wheat of all the village put together. He sent 22,000 maunds of sugarcane to the mill compared to 2,000 maunds for the village. He says that it is most too far to go with the bullocks and only one villager, who has 50 acres, has a tractor.

Mr. Maihra has his own tube well for irrigation driven by an electric pump. He says that the water table is rising from about 17 feet six years ago to only 12 now. He says the soil is just a bit too sandy for the best paddy. It is about a loam to silt loam. He has a Fordson tractor and one small German tractor.

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He gets 50 maunds of paddy per acre and 30 maunds of wheat after paddy. He has 20 acres of cotton but during the last three years the monsoons have been late and greatly reduced the yield. Previously he got 20 maunds to the acre of seed cotton but recently only 8. He sells his wheat for seed. It looks nice and is disease free. He grows American hybrid maize at 50 maunds (73 bushels) per acre.

He is very careful about rotations with legumes and the use of organic matter. He uses 44 pounds of nitrogen as ammonium sulphate but no phosphorus. He has only two bullocks and about eight cows. He lives in a bungalow near Panipat and has part of his storage and equipment there.

He tells me that 50 good (standard) acres are the very minimum for one-tractor farming. But a really progressive farmer with his one tube well and other equipment should have at least 150 acres. (This checks with what Capt. Rattan Singh told us yesterday at the Colony Farm.)

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I walk with him along the borders of his fields and notice an enormous contrast between his wheat and that of the villagers. He says it is not possible to prepare the seed beds properly with the old bullock plows. They don't use enough fertilizer nor proper crop rotations.

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He then refers to the more or less ad hoc Rabi (winter season) and Kharif (summer season) production campaigns. He says that a good Rabi harvest can be expected. India needs an extra 1,000,000 tons of grain each year just to care for the increasing population, and there should be more to raise standards of living. It is hoped to double production by the end of the third 5-year plan. (This is physically and biologically possible, but not administratively in my judgment.) The control of population, desirable as it is, he says, has many difficulties.

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Ap. VII, VIII

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Mr. Jain refers to the good results had in China by mobilization of farmers. (The new China influences quite a few people here.) He suggests special training camps for farmers with teaching by the scientific staff. "Research workers must leave their ivory towers and work with the farmers." Failures of farmers to use research results is due to poor organization and planning.

He calls attention to the presence of the Ford Foundation team, asks all ministers to help us, and welcomes us.

We then adjourn for tea. I meet again Dr. B. N. Uppal, Agricultural Commissioner of ICAR; Dr. J. K. Basu, Soil Conservation Director; and Capt. Mohite, Director of Agriculture for Bombay State at Poona.

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We meet again in another room with Mr. Jain in the chair. He calls on the State Ministers to speak to the report on administration and to the matter of increasing production.

Andhra Pradesh (Mr. Thimma Reddy). The speaker thinks that the report raises the status of agriculture but it will be hard to get the money. He says his State is poor. He objects to the rigid pattern of State aid from the Center which his State cannot match; thus his farmers do not get much help from the Center. He insists they must have bulldozers if land is to be reclaimed. India still imports luxury goods but claims they have no foreign exchange for machines. Even baby food is imported, which the cultivators do not require. Officers must speak at this meeting, not just ministers; they know the facts. But he says that some fertilizer is stolen and some goes from the cooperatives into the black market because the demand is so high. The Ministry of Food and Agriculture in Delhi must be stronger and get more money for agriculture in the plans.

Assam (Mr. Moinue Haque Chardry). The Minister says they have adopted several committee recommendations of great benefit. He insists that directors of agriculture must be technical men and he gives figures showing the plans for higher salaries for agricultural officers.

Bihar (Mr. B. S. Patel). The Minister suggests that the low production for sale is due to the small acreage per capita. They have accepted several recommendations of the committee but not those on promotion by merit. He insists on a compromise between merit and seniority.

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Bombay (Mr. V. P. Naik). He agrees with the committee recommendation for removing "dead wood." But he asks how the Department of Agriculture can be called an important department when it has no control over the many agricultural activities of other departments. He says it is very difficult to raise the salaries of agricultural officers. He emphasizes the need to decentralize power over operating budgets. The supply of fertilizers must be increased to avoid the imports of food. He cannot get enough sprayers without imports, especially of engines and pumps. The State needs 45,000 tons of ammonium sulphate and 35,000 tons of superphosphate.

Madhya Pradesh (Dr. K. N. Katju). The Agricultural Ministry should cease to be a minor one; but the recommendations might make it too large. State cabinets should have standing committees among the ministers for agricultural coordination. He emphasizes demonstrations rather than camps for training farmers. He opposes an All-India Agricultural Service.

Madras (Mr. M. Bhaktavatsalam). The Minister supports higher salaries but opposes an All-India Agricultural Service. He has an efficient research council that handles technical questions. Although the GOI is committed to price supports this has not been done and should be. Although yields of paddy in his State are now relatively high for India, they can be doubled.

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Rajasthan (Mr. Nathu Ran Mirdha).. The Minister stresses that the Agricultural Department cannot handle irrigation. He needs more foreign exchange to develop research.

Uttar Pradesh (Guatam, a Moslem). Several of these recommendations of the committee not requiring new finance have been adopted. The promotion of others have led to difficulties. They will have examinations for promotion. He stresses taking research to the field. He asks the Union Minister of Food and Agriculture for lump-sum grants to carry out what is asked for. He suggests that ICAR give grants without matching State funds. He emphasizes the need for drainage.

Mr. Jain replies that he had insisted that the funds for agriculture were too small; but the reply was that the funds were adequate. All State Ministers were informed.

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The meeting closes at 1:40 and we hurry back to the hotel for lunch.

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The State representatives say that their budgets are fixed in the plan so that they have no funds for matching grants given by the Center for research and the like. Officials of the Center are willing to concede only some relief for States that have made already large appropriations for research.

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THE INDIAN EXPRESS

NEW DELHI: FEBRUARY 6, 1959.

Well Managed?

IT is not in every case of delayed action that it is better late than never. The readiness of the Land Reforms Committee of the National Planning Commission to discuss the question of exempting well-managed farms from the laws relating to ceilings might be welcomed if one were not obliged at the same time to think of the consequences of vesting discretionary powers in officials, particularly those at the lower rural rungs. It is rarely that an intrinsically harmful measure can be improved by exceptions which are not so much afterthoughts as grudging concessions to the logic of inescapable facts.

The truth is that no inroad into the sacred rule of land ceilings would have been brought before the Planning Commission, if the authorities were not confronted with the "possibility" of food production being affected by fragmentation of landholdings. Was this, however, so late and unexpected a discovery that the Congress, the Commission and the Central and State Governments should have proceeded merrily with their land reform until last-minute doubts and hesitations induced some slight changes? Land reforms have gone on, though in piecemeal fashion, for nearly a decade, during which food production has suffered marked vicissitudes. But the vicissitudes have not been such that credit for progress could be given whole-heartedly to the reforms and the setbacks blamed on other factors and circumstances.

If the Government had cared half as much for the food of the people as for their votes, they would long ago have initiated an enquiry, secret or open, into the effects of land reforms on agricultural production and revised their ideas about what should be done immediately and what should be postponed to a later date. But such openness of mind is perhaps too much to ask for or expect. The momentum of old slogans and of hasty pledges made at the polling booths is too strong to resist. Just when one would have expected the leaders to strike a note of caution and prepare the public for a slowing down of the programme in the interests of food production, there is a new note of vehemence in denouncing State Governments for their hesitancy and in urging them to go forward oblivious to practical considerations.

There is probably a degree of willingness to recognise that the use of land is far more important to the country than the title to it. But even now there is no recognition of the harm that may be done to agriculture by a violent redistribution of land holdings. What is recognised is the claim of a well-managed farm to continue on the same lines for sometime. If reports speak true, the difficulty exits only on the definition of a well-managed farm, entitled to exemption. In Britain, land laws have been administered on the basis that one who does not put his estate into good use must be evicted without compunction. Only recently a large landowner had to step aside to give room to the state under this law. It is not therefore merely a difficulty of definition. The skill of the draftsman can never make up for the corruption or inefficiency of the administrator. In India, the efficiency of farm management cannot be judged over short periods. Discretionary powers in such conditions can only encourage demands for the abolition of all exemptions.

To meet the State Ministers

Shri Ajit Prasad Jain

Union Minister for Food & Agriculture

At-Home

on Saturday, the 7th February, 1959 at 5-00 p.m.

at Vigyan Bhavan

WIDE REFORM OF AGRICULTURE

7 Feb. 1959

STATE MINISTERS ACCEPT REPORT

NO DECISION YET ON ALL-INDIA SERVICE

State Ministers of Agriculture concluding their two-day conference in New Delhi on Saturday, agreed on launching a country-wide drive for higher production during the forthcoming kharif season and accepted the Agricultural Administration Committee's report.

NO decision, however, was taken on the proposal for setting up an all-India agriculture service.

The Ministers also called for an assurance of a fair price to agriculturists. In a resolution, they said, one of the important measures for increasing production and maintaining it at a high level was to provide a fair price to the producer, "after taking into account all aspects of the problem". They called upon the Government of India to take the necessary steps to achieve this.

Another resolution pressed for larger supplies of chemical fertilizers. "The conference hopes that the Central Government will make every effort to meet the growing need of fertilizers by direct purchase, barter or other arrangements from abroad until such time as fertilizers are produced within the country in adequate quantities," the resolution said.

During the discussions on the kharif campaign at the plenary session of the conference, it was announced that the Government of India had decided to double the States' supply of iron and steel to meet agricultural needs.

The Centre also agreed to make available an amount, likely to exceed Rs 4 crores, for the provision of short-term loans to farmers during the kharif campaign, besides supplying insecticides and pesticides.

STATES COMPLIMENTED

Addressing the Ministers this afternoon, Mr A. P. Jain, Union Minister for Food and Agriculture, complimented them on approaching major problems like the Nalagarh Committee's recommendations and the kharif campaign in a "grass-roots" manner. He said he had felt for some time that one of the things retarding higher agricultural production was "a loose and somewhat primitive organization" of the agriculture department at the Centre and in the States.

The Nalagarh Committee, whose report the State Ministers adopted almost in its entirety, had certainly made valuable suggestions, he said. It was not until the appointment of the Committee that anything really effective had been done to improve agricultural administration.

Referring to the financial implications of the Committee's report, Mr Jain said: "We need not be deterred by them. Money must be found and we cannot wait for the third Plan. During the two years of the present Plan we must find the money at least to implement the major recommendations. I will scrape together every farthing I can for this."

The Minister concluded by saying that every scientist, however highly placed, must work by the side of the farmer and convince him about the value of his techniques. He said 200 plots had been selected in the Delhi area for demonstration of improved agricultural practices, "and the farmer is waiting to compare his results with those obtained in these plots".

Before the conference concluded, Mr Thimma Reddy, Minister for Agriculture, Andhra Pradesh, thanked Raja Surindra Singh of Nalagarh and his Committee for their exhaustive study of agricultural administration in the country.—PTI.

LOW PADDY YIELDS IN STATES

Food Minister's Plea For Special Study

BY OUR SPECIAL CORRESPONDENT

The Hindustan Times

SATURDAY, FEBRUARY 7, 1959

NEW DELHI, Friday.

MR A. P. Jain, Union Food and Agriculture Minister, today drew the attention of the paddy-growing States to their "special responsibility" for making the kharif production drive a success.

In particular, he named Orissa, Bihar, Uttar Pradesh and Madhya Pradesh, which have about half the paddy acreage in the country but have the lowest yields.

Mr Jain suggested a special study by these States to determine causes for low yields and pointed out that yields could be improved by adopting line sowing instead of broad casting, growing only a few improved varieties and extending acreage of short-term high-yielding varieites.

The Minister, who was inaugurating a two-day conference of State Agriculture Ministers, emphasized the importance of the intensive production drive in the context of the fact that population control could not be an effective solution in the immediate future, while the rate in increase of population was now nearer 2 per cent per year compared to 1.25 per cent in 1951.

Another item on the agenda of the conference is the report of the Agriculture Administration Committee, which has recommended a re-orientation of the administration of the State Agriculture Departments.

Mr Jain urged immediate implementation of the recommendations having no financial implications, such as those relating to procedural matters, delegation of powers to officers at different levels, simplification of budgetary procedures and expenditure sanction, revision of service rules, and co-ordination between irrigation, development and agriculture departments.

The Minister commended the committee's suggestion for an all-India agricultural service and said that financial considerations should not stand in the way if the proposal was acceptable to the States on merit. Such a service would involve pooling of posts, control and additional expenditure on account of difference between Central and State service scales.

HIGHER PAY GRADES

He supported the recommendation for higher grades of pay to staff of State agriculture departments and thought that additional expenditure would not be so high as it seemed at first sight. Though no estimate of the expenditure had been made, it was obvious that higher salaries would be accompanied by increased output. Moreover, only competent staff would be appointed to the new grades.

Mr Jain emphasized the need for separating "trading functions' from scientific and educational work and relating the latter more directly to food production and raising of food output. Research workers, he said, should leave their ivory towers. They should be mobilized during the kharif campaign to go to villages, stay with farmers and help them through demonstrations.

He said he had no doubt that within the existing resources much greater progress could be achieved by gearing up departmental machinery "for an impact programme of production."

Mr Jain told the conference tha between April and June chemical fertilizers would be transported to railheads and it was for the States to arrange supply points for timely distribution for the kharif campaign. But a vigorous drive for increasing the production of compost and green manure should go hand in hand.

MORE PROVISION

The Minister disclosed that in the next financial year there would be a higher provision (Rs 22 crores) for minor irrigation works. He suggested that all States enact legislation to enable them to carry out construction of field channels and recover expenditure from beneficiaries. Groundwater exploration had indicated tubewell construction was feasible in Madhya Pradesh, Madras, Andhra Pradesh, Orissa and West Bengal.

The need for mobilizing farmers by a training programme on the lines of "gram sahayak camps" in U.P. was also emphasized by the Minister. He also called for co-operation of public men and non-official agencies.

PTI adds: Opening the general discussion, Mr Thimma Reddy (Andhra) said the general mass of agriculturists were thankful to the Nalagarh Committee for its "very valuable report." It contained useful suggestions which, if implemented, would enhance production of food grains.

Mr Moinul Haque Choudhry (Assam) agreed that there should be planning at the village level and said that the Assam Government had decided to form field management committees, the idea being to decentralize administration and to use village panchayats in this connection.

KHARIF PROGRAMME

Mr B. C. Patel (Bihar) speaking on the kharif programme said Bihar was planning to train one million village project leaders for this purpose.

Mr V. P. Naik (Bombay) underlined the need for adequate supply of fertilizers and said the import of fertilizers would cut down food import considerably.

Dr K. N. Katju (Madhya Pradesh) suggested that utmost emphasis should be given to village demonstration farms. He also favoured the settling of agricultural graduates in villages.

Mr M. Bhaktavatsalam (Madras) pleaded for comprehensive and scientific examination so as to assess the actual cost of agricultural production and to determine fair and reasonable prices both for the consumer and the producer.

Mr K. F. Patil (Mysore) said the Nalagarh report should enable the States to put the agriculture department on a higher footing, at least on par with the more important departments.

Mr R. N. Rath (Orissa) suggested the formation of a sub-committee of the State Cabinet to deal with matters concerning agriculture and allied subjects.

The Rajasthan Minister said Rajasthan was completely prepared to undertake the kharif drive.

Mr Gautam (UP) stressed the need to take results of research from laboratories to the field and said the agricultural university, to be set up in his State, would have this as one of its objectives.

Dr R. Ahmed (West Bengal) said he was opposed to the idea of an all-India agriculture service. He pleaded for timely announcement of fair prices for agricultural produce before the start of an agricultural season.

Nairobi Welcomes Queen Mother

West African PM To Meet Smith

CEK

(For committee members only). 8 Feb. 59

Tentative items for inclusion in report

1. A scheme for minimum prices to protect farmers and for maximum prices to protect consumers along with carry-over storage: The minimum prices should be high enough to prevent catastrophic lows. They should be announced well before planting time and these should be paid to the cultivator in full at places reasonable for him to deliver by bullock cart. Perhaps the U. S. Government might use PL 480 funds to help with good storage, in both large cities and small country market towns. Also the U. S. might make a gift of food grains to help establish the base carry-over to get this scheme under way as a longtime constructive program.

Without such protection, cultivators are unlikely to use such conservation practices as fertilizers, manuring, bunding, good rotations, and the like in proper combination. The announced prices should vary somewhat from year to year as needs for various products change.

2. A study of existing laws and suggestions for new laws and follow-through to provide that uncropped land already having transport available and suitable for more intensive use be used for crops.

(a) Owners or holders, including governmental agencies, should be required to place them under use or the government should take compulsory leases and sublease on fair terms to farmers.

(b) Comparable provisions should be studied for ill-managed cropland having production below one-half the average on comparable soils and with other similar growing conditions.

3. The removal of earth from agricultural soils should be permitted only under licenses that are granted only when adequate materials for brick manufacture and other uses are not available from poor soil areas or from areas that can be and are to be restored to their former productivity through land-forming and other necessary practices. When licenses are given for taking earth from good agricultural soils, because other sources are not available within a reasonable distance, operators should be required to go to depths of 10 feet or more to keep the total surface as small as possible, and where useful, to leave ponds for fish and other uses. This would require a small staff including geologists familiar with materials used for bricks and soil scientists trained to appraise the agricultural potential of soils.

4. A study of acreage ceilings to avoid such low ceilings becoming fixed that neither present nor future operators can carry on efficient farming, including high-yielding combinations of fertilizer practices, water control, good seed, tractor power, and so on. Unlimited opportunities in other pursuits, and low ceilings for farm enterprises would be grossly unfair to rural youth and lead to a poor and inefficient agriculture unable to sustain an industrial society. Other ways are open for the government to insure adequate use of agricultural resources.

5. Millions of acres of potentially excellent cropland require drainage (a) so they may be used for crops or (b) so that yields may be greatly increased with good seed, fertilizers, and other practices. With increased irrigation under the present systems this problem of poor drainage will increase sharply. It should not be allowed to spoil excellent soil for crops as it has in the past.

Commonly poor drainage, caused by increased irrigation, by both old and new shallow excavations for earth to make bricks and to construct highway grades and elevated canals, and by poor highway planning is accompanied by accumulations of salt or of alkali (exchangeable sodium). Except for the small percentage of soils having deep water tables and porous substrata, most that are irrigated need also drainage for sustained production. Thus drainage is the soil conservation practice needing great exphasis in India now - in fact fully as much as irrigation; although it must be emphasized that no single practice gives good results by itself without the others in proper combination.

Drainage of surface water alone does not give worthwhile results on the majority of soils. It is necessary to use ditches or, preferably tile, to remove excess water from the zone of crop roots. Besides deep drainage channels for this purpose, field drains (or "quarter drains") are required at distances of roughly 100 to 500 feet depending on the hydraulic conductivity (the rate and volume of water movement through the soil) of the soil.

With such drainage simple salts may be washed out into the drainage. Alkali soils having high amounts of exchangeable sodium must also be treated with gypsum in order to replace the sodium on the clay complex with calcium, with the sodium sulphate continually leached out.

Great emphasis needs to be given these matters by both the Center and State Governments. Now many State and Center agencies have some responsibility. In fact, it is so divided that no one really has responsibility for research, publicity, training, surveys, or action.

In many places a grid of large ditches are needed, perhaps for areas included in two or more States. Special districts or authorities are needed to get this work done. Besides departments of agriculture, irrigation, and public works, the agencies responsible for highways are involved because new and large culverts are commonly required. In fact, much of the present damage is due to a combination of increased irrigation and poorly designed highway grades.

With provisions for the main drainage ditches, local communities can complete the system on farms under the technical guidance of departments of agriculture staffed with soil scientists and drainage engineers or, better still, with soil scientists and engineers trained in both irrigation and drainage.

6. The principle of combined practices applied together in order to have the great benefits of the interactions among them needs recognition in programs for soil conservation and increased food production. Emphasis on single crops or single practices rarely if ever yields economic results.

The aim of the cultivator is to produce from the soil he has a better soil for crop plants by controlling water, through any necessary irrigation, drainage, and runoff control; by keeping plant nutrients abundant through composting.

crop rotations, and the use of farm and chemical manures; and by developing and maintaining a deep rooting zone of good structure for the growth of roots and the passage of air and water. Thus each kind of soil requires a somewhat different combination of soil conservation practices to produce the optimum result.

Despite many attempts to do so no sound generalizations have been or can be made about any single soil conservation practice. What is helpful on an area of one kind of soil may be harmful on an area of another kind of soil in the same farm or village.

Then beyond these field practices, the same principle of combined practices applies to the management of farms. Price floors to prevent very low prices, adequate credit, dependable sources of agricultural supplies are essential parts of a system of economic sustained production from the soil, which is the only kind of soil conservation that India can afford.

As a quick way of getting some preliminary ideas of how to plan effective research and demonstrations, tests of single items, such as irrigation, seeds, bunds, fertilizers, and so on have a place. But the results of such single tests have little if any value as a basis for recommendations to cultivators. It is not a question of what a fertilizer will do, for example, without water control and with poor seed, but what the combination of water control, fertilizer, and good seeds (along with all the other needed practices) does. Commonly this result exceeds by several fold the result of applying just one "improved" practice by itself. In fact, it is the whole system of conservation that is either "poor" or "improved", not the individual parts of it. Only from research and demonstrations of the combinations can sound recommendations be developed.

India has great areas of soils among the best potentially in the world. With proper combinations of practices, according to the many kinds of soil, yields can be higher by several fold.

February 7

We are up at 7:00 as usual, then breakfast and work on notes.

We go to the Conference of State Ministers of Agriculture at 9:50. They are slow in arriving. The meeting finally starts at 10:37 with K. R. Damle in the chair.

He takes up the Kharif crop campaign for 1959. He asks each State about its seed supply. Some agree to furnish specific seeds to others. Then he asks about insecticides, which seem to be in short supply. There follows a hot argument about quotas for iron and steel to suppliers of dusters and sprayers. It seems that the man responsible for these quotas "had an appointment" and couldn't come to this meeting. I don't blame him. Apparently the ceilings were promised by all, but the actual steel doesn't get to the manufacturers.

They also argue sharply about fertilizer supplies. It is clear that the amounts of fertilizer available are pitifully low. Besides their small domestic production, Rs 12 crores of foreign exchange are allotted to fertilizer imports plus income from export sales of groundnut cake. This last item is going down because of increasing local demand and price.

The Center promises to get money for the States at 4½ percent, which they, in turn, can loan to farmers on a short-run basis. There is talk about price supports. Many are for them. But one asks, "How can 20 percent support 80 percent?" This is ridiculous since

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only about one-third of the food goes through the markets. A speaker from Orissa says that rice is now selling in some villages for as low as Rs 6 per maund. He asks, "How can the cultivator go ahead when the more he produces the lower the price?" Another says that a high price drains too much food away from the village. (Of course it does. They should have neither a very low or very high price.)

The chairman raises a question about oil seeds, especially groundnut and castor. Country-wide yields and area of groundnuts have been going down. These must be increased for the foreign exchange they bring, and also mustard rape. For groundnuts, pest control, improved seed, and fertilizers are stressed; and for these some subsidy is available from the Center. Castor can be grown along field boundaries. High prices cannot be paid for these crops and still sell them in world trade. But one speaker argues logically for minimum price supports. The Center promises to give seed for new areas of production. (I can't help but feel that the technical preparation for this conference has been poor, especially in terms of agricultural geography.)

We leave at 1:10 before the session is finished, have lunch and are back at 2:30. With Mr. Jain in the chair, they take up the recommendations again of the committee on agricultural administration. Despite the previous wrangling most of the recommendations about personnel and organization are accepted. Additional resolutions are passed asking for more money and more foreign exchange for fertilizers.

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At the end everyone seems happy. Mr. Jain gives them a good pep talk on both problems and successes. And two of the Ministers give pretty speeches to him and his committee.

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February 8 (Sunday)

Up at 7:00, breakfast, and work on notes. Dr. Raychaudhuri calls about 9:30, just as the barber starts to work, asking me to meet with the soil correlators. I agree and he offers to send a car in one hour. Actually the car comes at 11:00, driven by Mr. Govindanrajan, the soil correlator at Bangalore. We drive out to the new quarters for soils at Poosa Institute - the IARI headquarters.

Besides Dr. Raychaudhuri, I meet Dr. Basu, S. P. Gupta, R. S. Murthy, Satyanarayans, S. Digar, and B. B. Roy. (The last three are also soil correlators.)

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They have set up a series of areas according to priority, based largely, I gather, on needs for erosion control and other works to protect new dams and the like. These priorities are established in full conference, so it is said, with the States. Dr. J. S. Kanwar, agricultural chemist at Ludhiana, had told me he got no help on soil survey. Yet these boys say he took part in the meetings planning the work!! The agricultural lands are mapped in detail on village plats at a scale of 8 inches equals one mile. Hilly and other soils not suitable for crops are mapped.

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in reconnaissance at 2 inches equals one mile. Three catchment areas are being surveyed in the Punjab near the mountains. These run about 25 to 59 percent agricultural land.

I look at some of the maps. They intend to publish a map of 10 villages or so on one map at 2 inches equals one mile and the individual village maps. They have long, fractional symbols and again I point out their many dangers. I also insist that they have a scheme for training the extension people in how to use and interpret these new maps. I'm told that in Bombay they want contours on the soil map. I tell them that this usually clutters the map too much and that I prefer separate maps at the same scale. But I suggest they try it both ways, keep cost records, and see which way works out best.

We discuss the serious drainage problem in the Punjab, which these men understand fairly well. They say that responsibility will be with the CWPC, Mr. Hyat, chairman. For the soils high in sodium they have plenty of gypsum but freight rates are high. The rate is the same as for fertilizer; whereas the rate for both lime and gypsum should be like that for sand and gravel.

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Dr. Basu says the planners are asking for soil conservation on more acres at lower costs per acre! In Bombay State cultivators will carry all costs for bunds but need 15-year loans. He has been made chairman of the Soil Conservation Board and expects to have 2 months in the U. S. next summer.

He brings me back to the hotel for lunch at 1:30 p.m.

A little after 3:00 p.m. Dr. Ralph Cummings comes to the hotel and we have a good talk about the work of my mission this year, the results of my last one, and Indian agricultural problems. He is skeptical, as I am, of ceilings on land holdings, cooperative farming, and the big effort of village extension work. Then I write Rene Tavernier about the possibility of an Indian trainee in the Congo on soil-geomorphology.

After a bit of reading and writing, dinner. Then more of the same and to bed.

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Dr. Sen wants us to go through the first and second 5-year plans. Why did these partly fail? Policy wrong? Poor administration? (This is obviously the big reason.) What sort of a society and agriculture should they look forward to in 1966 and in 1976, considering their intentions and their resources? What about specialized farming versus mixed farming? What about communications among agencies and with the public? What to do in the most backward rural areas where living standards are very low?

(As the meeting progresses, it is obvious that classical U. S. Extension of 28 years ago dominates the program and promises too much. Our group is so large that I fear it will be difficult to get down to serious work. Here we are on February 9 still talking about what we "may" plan to do! Apparently the Ford staff here has not been able to do much advanced planning. This contrasts to the advanced planning done for me last year.)

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I talk with Basu and a bit with Nehemiah about early conferences with the people of CPWC. No plans had been made for such vital discussions.

I lunch about 1:20 and return to the office. I try to work out at least a tentative schedule. About 4:00 p.m. Dr. Raychaudhuri, Dr. Basu, Mr. Mandan, Mr. Rama Rao, and Mr. Satyanarayans come in and we discuss alternative visits for myself and Omer Kelley.

These I make out in more detail in the evening: (1) West Bengal and Orissa, (2) Bangalore - Cochin, etc. and (3) Jodhpur.

Dinner, bake my back, read, and to bed.

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The Hindustan Times
NEW DELHI

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MONDAY, FEBRUARY 9, 1959

THE GREAT DEBATE

Whether Mr Nehru regards himself as a man of destiny or not, he went on record at his Press conference on Saturday as wanting to see this country changed more to his liking "in the few years that may be left" to him. A natural desire, perhaps, but not a sufficient reason, we submit, for hurrying the nation in rash directions. Impatience is often the enemy of real progress and statesmen setting out to construct for the future of great societies do normally realize that it may not be given to them individually to see more than a few bricks laid in their places. What really ought to matter to them as it does to the community they wish to serve is that the edifice, when completed, should be a sound and enduring structure. One of the important virtues of a democratic political system is that it carries built-in safeguards against impatient holders of power. The Prime Minister has stated that he believes in co-operative farming with "passionate conviction." It is good that the making of policies should be backed by personal faith on the part of the maker. But is one man's faith enough, even if that one man be the nation's leader and the Prime Minister in its Government?

Mr Nehru denies that he has influenced the Nagpur decision in any special manner and he argues that the programme adopted at that session has not been sprung on Congressmen suddenly but has been discussed over a long number of years in various forms and at various levels. It is, however, one thing for the Congress or the country to agree in a general way that the co-operative principle should be given scope in agriculture and industry and quite a different matter for a handful of leaders, however eminent or well-intentioned, to assume that they have secured a *carte blanche* from the nation for each and every individual application of the principle which they may happen to favour but to which there may be specific and serious objections on merits. For instance, does it follow that because the nation has generally agreed that the co-operative way of life is a good way, people should not protest if they are asked to give up family kitchens for communal ones? There are qualifications to every principle and in a democratic community the co-operative principle must be held to be qualified by the need to preserve certain residual and ultimate rights of the individual. If the Nagpur resolution is questioned, it is not because it advocates the co-operative principle, or even because it argues for joint farming, but because it enjoins on the State a programme for establishing through the active exertion of the machinery of Government an agrarian pattern involving an extinguishment of certain individual rights which, experience of history and our knowledge of human nature tells us, has not been achieved elsewhere and cannot be achieved in this country on any considerable scale with the willing and voluntary consent of the people affected. It is significant that Mr Nehru himself has not fought shy of the fact that, at some stage or other, a certain degree of compulsion may have to be exercised in order to shift the countryside from family farming to joint farming and he has sought to justify this possible compulsion by arguing that governments, after all, are everywhere compelling people all the time to do certain things or not to do certain things, as for example, when they tax the people. Some may think that this cosmistical way of looking at matters which vitally affect the way of life and the livelihood of millions of people confirm fears about the shadow which the Nagpur approach may throw on the democratic future of the country.

Meanwhile Mr Nehru is certainly entitled to ask why anybody should object even to that part of the Nagpur resolution which proposes that the country should be covered by service co-operatives in the next three years unless the objection is to the co-operative movement itself. Part of the answer clearly is that because the Nagpur resolution views service co-operatives as a preparatory and transitional phase to the inauguration of joint farming at the end of three years, there is bound to be an apprehension that the so-called service co-operatives will not be allowed to be organized and run as truly co-operative organizations but as instruments for herding peasants into joint farming. Normally those who are opposed to joint farming should welcome service co-operatives as the means whereby family farming could maintain its integrity while deriving the maximum benefit from the co-operative organization of facilities in the fields of credit, marketing and provision of implements and other farming aids and stores. But once it has been made clear that family farming is to disappear and that service co-operatives are intended to be employed as cells which would in due course bring the whole village under joint farming by means which, starting as persuasion, may change imperceptibly into varying forms of pressure, it clearly becomes necessary for the people to judge the programme in its entirety, relating each part thereof to the ultimate aim. Three years, after all, are soon ended.

Then, again, there is the fact that while there is nothing new in the idea of "service co-operatives" as such, what is new—and disturbing—is the move to use them as a short cut to joint farming. The country, of course, is familiar with multi-purpose co-operative societies a number of which have been functioning for a number of years and with varying degrees of success in different parts of the country. If the service co-operatives are to be different from the multi-purpose societies, where and how will they differ? This is only one of the major implications of the Nagpur resolution which the enthusiasts of that programme have not yet found time to enlighten the public about. It is however becoming clear already that great pressure will be worked up to make the

Highway Robbery Near Bhilwara

Alwara-Banswara Road Project

Campaign With No Focal Point

Continued from page 1, col. 4

...ani Award To ...minated

BANGALORE, Feb. 8.

EMBEZZLEMENT CHARGE FAILS

Reservation For Harijans

Aligarh Seven Helps ...

State Governments relax their authority and supervision over the actual conduct of this next phase in the co-operative movement. The propagandists have been making clever—if somewhat unscrupulous—use of the slogan that a genuine co-operative movement should not be kept tied to the apron strings of the bureaucracy. But while they object to government supervision they apparently have no qualms about depending indefinitely and predominantly on official finance. The first principle of genuine co-operation is that it should strive to cut loose from government sustenance as early as possible. But this principle has been conveniently forgotten. What the so-called reformers demand is, apparently, a new co-operative law which would give non-official, private individuals a large freedom to handle public funds without having to submit to government supervision. The casual references which the Prime Minister made at his Press conference to that perennially unfortunate official—the Registrar of Co-operative Societies, Punjab — shows that this campaign may well succeed. Since crores and crores of rupees of public money may be involved in the proposed phase of the co-operative movement, the prospects of thousands of private individuals being thus entrusted with the use of these funds, without strict procedures of accountability being enforced on them, are not precisely appealing. Herein lie, besides the obvious financial risk, the more subtle dangers of political jobbery and patronage and the corruption of public morals.

Presumably the new service co-operatives are to be constituted on the recently adopted basis of "one village, one society." It will be recalled that the Rural Credit Survey had rejected this basis in the case of co-operative credit after a realistic discussion of its implications. The Survey stated: "It is our considered view that the formula 'one society to one village and one village to one society' has failed in India as the basis for the organization of rural credit. It has failed because its underlying assumptions have not proved correct. Those assumptions were that mutual knowledge would help to determine, and honorary service help to operate, credit; that the first would be most effectively present and the second most effectively developed within the confines of one village. In actual fact, as we have already seen, the compactness of size has not been accompanied by any of these other features." Accepting this conclusion the Government of India were until recently in favour of developing co-operative credit on the basis of primary societies covering larger areas than a single village and commanding a sufficiently economic turnover to be able to afford competent trained staff. But now steps are not only being retraced in the credit field, but the much more complex job of multi-purpose co-operation is presumably to be entrusted to village societies organized and run by non-officials with access to public funds, but absolved of the responsibility of having to handle them under government supervision. The fact that simultaneously ceilings are also to be fixed by legislation, resulting possibly in the emergence of new tensions in the countryside—especially because the question of compensation is liable to become a very complicated one—will, if anything, add to the difficulties of creating a proper co-operative atmosphere for the village societies. Then there is the question of establishing a pattern of co-operative functioning between the various agencies in the field such as the revenue department, the community projects administration and the new village societies—a problem which might strain administrative ingenuity right at a time when that quality is by no means abundantly present in the government structure. It may be argued, of course, that if difficulties there are, an effort must be made to overcome them. But to what end? One of the oddest aspects of the propaganda that is being carried on for the Nagpur resolution is that the argument is not often heard now that the proposed reorganization is necessary for or is capable of increasing agricultural production. The prospects are that by diverting resources and effort from the really worthwhile job of promoting the co-operative credit and other facilities which could be made available in the normal way to the peasants without threatening to undermine or extinguish the system of family farming, the Nagpur approach may do a disservice to the cause of agricultural expansion which is among the nation's foremost priorities at the present time.

Medical Facilities

VALIDITY OF U.P. ZAMINDARI ACT

No Constitutional Point Involved

February 10

This morning I go to the office at 8:30 to talk a bit with Basu and Ahuja about schedules for Omer Kelley and me. We don't make much progress. At 9:00 we have another general session with our Indian associates. We are told that Minister Jain will expect us about 4:00 p.m. tomorrow; and perhaps after that Minister Dey. Then the plan is for us to meet the Vice-Chairman of the Planning Commission, Sir V. T. Krishnamachari, at 11:00 on Wednesday. We are supposed to go to the House of Industry at 3:00 p.m. Friday.

It is also agreed that someone from the team should visit each of the States with the exception of Kashmir. At least one person from the team should call on the chief minister, the minister of agriculture, the secretary and director of agriculture, and the commissioner for Community Development. We have some more impromptu and useless talk about schedules. Then a bit before 10:00 we go to the Central Power and Water Commission where we meet Chairman Hyatt and several of his staff.

They tell us that irrigation and related projects are divided into three classes: (1) small, under Rs 10 lakhs, which are handled by departments of agriculture; (2) medium, Rs 10 lakhs to 5 crores; and (3) over 5 crores. These last two are handled by departments of irrigation and agencies for power in the States for the most part. Most of the medium ones are handled by the departments of irrigation. For the others special boards are set up with representatives from

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They tell us that they first started considering the problem of waterlogging a little over a year ago and realize that it affects 10,000,000 acres mainly in the Punjab and the U. P. I suggest that the figure is very much higher. They admit that this is true if areas are included which will soon go bad unless drained. The question is raised about using more water from wells and less from canals in the Punjab. They say that it will be necessary to equalize costs some way because canal water is cheaper to the cultivator. They admit that they have enormous losses of water from the unlined canals, which contribute heavily to waterlogging. But the linings are very expensive.

We are told that the district and local watermasters are normally employees of the State irrigation departments.

The general policy of the CPWC is not to emphasize large irrigation projects in the third 5-year plan. Many current schemes will carry over and they will have some large irrigation works as one of the uses of multiple-purpose projects that include hydro-electric power.

At the end of the second 5-year plan, towns and villages with populations over 10,000, of which there are 18,000, will have electricity. Only a few other villages will have power, mainly where

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We have more general talk about wells and so on, and about 11:00 return to our office for more talk on schedules. I am getting real frustrated because Basu does not come and I cannot firm up a schedule without knowing what the Indians can do.

Dr. T. R. Mehta talks to us a bit on the great importance of kitchen gardens. He says that village and town people depend altogether too much on cereals whereas more fruits and vegetables could and should be grown. Some cities, he says, are doing a fair job. I take it that the lack of gardens is due to several factors, including lack of industry, lack of space among the landless, inadequate supplies of adapted seeds, and old food habits. Apparently many do not like sweetpotatoes, for example, which could be grown widely.

Then too, he points out the inadequacy of feed for the bullocks. He says that one reason for poor wheat is insufficient bullock power, because they are poorly fed, and late sowing. I am back to the hotel for lunch a little before 1:00.

After lunch I return to the office and read reports. Dr. Basu comes at 4:00 with his secretary, Mr. Khullar, who went with me on two trips last year. We work feverishly on different schedules and after cutting out a lot that Dr. Basu wanted I still end up with perhaps too much.

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At 8:30 I go to the office and give copies of the schedule worked out to Dr. Basu and to Dina Nath of the Ford Foundation.

At 9:00 Dr. Ralph Cummings gives the group a good review of the work of the Rockefeller Foundation on agriculture with special reference to maize breeding, the development of the graduate school here at the IARI, and some about sorghum and millet breeding.

Then we leave to visit Mr. S. K. Dey, Minister for Community Development. We start with a few questions. The summaries of his replies follow:

1. What effect on other projects would emphasis on food production have?

He says most projects are interrelated. So health is related to food. We can give some emphasis to agriculture but not without relation to other projects. We must be sure that cultivators realize they are human beings; and they must be emotionally aroused to get food. So agriculture cannot get a high priority in relation to health and other phases of the program. The cultivator will not respond unless he feels himself a citizen. Thus schools are very popular.

2. What are or should be the relationships between the programs of Community Development and agriculture on the one hand and the programs in agriculture, irrigation, animal husbandry on the other?

In not more than 3 years, the Community Development must shift its emphasis from agriculture to something else. The problem is one of coordination among agriculture, irrigation, and animal husbandry. These should be combined.

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In not more than 3 years, the Community Development must shift its emphasis from agriculture to something else. The problem is one of coordination among agriculture, irrigation, and animal husbandry. These should be combined.

3. With the emphasis on food production as a primary goal for Community Development at least in the immediate future, and with the decision to allocate 75 percent of the gram sevaks time to agriculture, is there a chance that Community Development, especially in the States, will tend to duplicate the work and program of the agriculture departments, or to create increasingly difficult problems of coordination between agriculture and Community Development?

This question does not arise because Community Development does not have a separate agricultural staff. Community Development has only added a "high-powered" administrative service to remove bottlenecks. Because this program is widely spread and recognized as firm future policy, the departments have no escape. They must cooperate. The competent departments welcome Community Development; but the weak ones fight Community Development, not openly but in other ways.

4. We have been told that increased food production is of crucial importance to the Indian economy and the realization of the second 5-year plan. We have also been told that partly for this reason as a matter of government policy 75 percent of the time of the gram sevaks is to be devoted to agricultural production. What specific steps has the Ministry of Community Development taken to implement this policy? More specifically, how is this policy reflected in the allocation of Community Development funds, the adjustment of Community Development schemes, and the allocation of Community Development personnel at the Center and in the States all the way to the block level?

He replies, "we have achieved agreement at the Center and in the States that this should be done. The agricultural phase is emphasized. The work in agriculture goes ahead according to the industry and competence of the agriculture, animal husbandry, and irrigation departments." He says there is no instance of agriculture being held back by gram sevaks. Most of the budget for agriculture is in the departments; the money for agriculture in the Community Development program is only a small nucleus.

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Agriculture may need more money; but most important is to make full use of what is available. This is not being done because of organizational difficulties. There is too much emphasis on service functions, which should go to the cooperatives, rather than on field demonstrations. (But functioning cooperatives do not exist!) Too many agriculturists were poorly trained in bad colleges.

In developing a program, one starts with good generalists and then develops specialists. First, we should have good State specialists, then at the divisions, then at the districts, and finally at the block level. But he does not favor specialists at the village level. There the cultivators should organize to supply services for themselves.

Even though in an emergency, we cannot follow the Soviet method. Because cooperatives are not ready, we should not turn to other means. Only by insisting on cooperatives and giving them responsibility will they develop.

What should be done where cooperatives have bad leadership? Mr. Dey says there are official and non-official vested interests who fatten themselves at the expense of others. He has had the responsibility for cooperatives for only a bit more than a month. He has scheduled an early conference with State leaders of Community Development about what to do with special reference to (1) rehabilitating old cooperatives, (2) starting new cooperatives, (3) training programs for leaders, (4) simpler procedures, and (5) more autonomy and responsibility for cooperatives.

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Mr. Dey appeals to me as a single-minded man with enormous confidence in and satisfaction with his own judgment. He could be a real empire builder; and I strongly suspect he is on his way. He is the very kind of man, I fear, who could be a dictator in the name of democracy! But I fear he is a danger.

At 11:00 we visit Sir V. T. Krisnamachari and part of his staff.

Sir V. T. says the Planning Commission expects each cultivator to carry out the programs that the experts say are sound, such as irrigation, good seeds, fertilizer, contour bunding, soil conservation, and forestry. A basic objective of Community Development is to get the knowledge used and to fill in gaps in that knowledge through research. Then the other improvements will follow.

I point out that we have been given three reasons for lack of progress: (1) conservatism of the cultivators; (2) lack of coordination among agencies; and (3) inability of agricultural officers to work with cultivators as citizens. He says that number 2 is most important. The main bottleneck is inefficiency in getting work done and furnishing supplies on time.

He emphasizes the need for fuller participation. Unless the movement spreads throughout the villages, the differences among the people will increase rather than decrease. Nor does he want a gap between living standards for city people and country people.

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Another staff member says that failures in agriculture are not from lack of investment but from inefficiency of organization. (I doubt that Sir V. T. and his staff realize how poorly the agricultural technicians in India understand the interrelations between the various technical practices.)

Sir V. T. says they need to double food production over 1956 in 7 years, at the end of the third 5-year plan, especially of food grains.

He agrees forcibly that waterlogging of soils must and will receive attention. He says they already have coordinating commissions in the States! (There is no evidence that any of them are functioning.)

He is anxious to revive cooperatives. They must be a genuine people's movement. They must put new life in the existing ones and form new ones. The cooperatives should include all families in the villages, not simply the farm families. They are to get supplies, handle marketing, supply credit, etc. And those of the villages will be fed by broader groupings. (I think this will take a long, long time.)

He says that land ceilings do not introduce uncertainty except as government policy is misunderstood.

He tells us that not enough State people are sent to the training centers in soil conservation.

He agrees that minimum support prices are necessary.

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They hope to double electric power between now and the end of the third 5-year plan. Thermo plants will be built within the coal areas to firm up power in a broad grid system.

We then go to visit Mr. J. S. L. Hathi, Deputy Minister of Irrigation and Power at 12:30. This Ministry deals with power, irrigation, flood control, and drainage. The CPWC is a part of this Ministry as its technical advisory group. The speaker stresses waterlogging in U. P., the Punjab, and parts of Rajasthan. He says to do much about waterlogging they will need to plan large schemes - they could not do much about the Karnal area by itself. He says there are some existing schemes for surface drainage only. He suggests that I visit a scheme for drainage involving several villages in Delhi State.

As an example of flood control he speaks of the "River of Sorrows" (Kosi) in Bihar. This river has changed its course many times and as much as 90 miles. For this they have a flood control board made up of the Ministry of Irrigation and Power, other ministries of the Center, including Food and Agriculture, and State representatives. For flood control the States put forward schemes which the Center examines and sanctions out of a fund of Rs 60 crores in the second 5-year plan. But essentially all of these funds are in the form of loans to the states although some grants were made for flood control in Assam where the city of Dibrugarh was threatened with immediate destruction.

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He feels that their work has been successful. Large levees along the River of Sorrow are nearly finished. The dams and other structures of the DVC withstood a recent severe test and prevented the flooding of 8 lakh acres by the Damodar River. In some parts of U. P. they have raised the levels of villages to get them above the flood plain. He also stresses soil conservation as a part of these schemes. (It is most unfortunate that soil conservation is used in India by most people as a synonym for erosion control, which is really only one small part of it.) He says that some of their streams may have 100,000 cusecs (cubic feet per second) in the monsoons and only 2 or 3 hundred in the dry season. He says that each State has a flood control board; and that there is a river commission for each large river with representatives from each State concerned.

It seems to me that they have become aware of waterlogging during the last year. On this point alone my efforts may have been useful. We discuss this a bit more and Mr. Hathi says that some lands in U. P. still have monsoon water on them.

We hurry to lunch. I work for awhile on my notes and go with Omer Kelley to Dr. Basu's office where we meet Prof. Dr. Janert of a University Institute for Soil Science and Land Amelioration at Greifswald-Eldena, East Germany. He is just finishing up a tour today arranged by the Prime Minister, Dr. Grotewald, during a recent visit to India. I am not quite sure to whom he has made his report but I suppose to the Ministry of Irrigation and Power.

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He seems knowledgeable and stresses internal drainage with a special kind of thermo-plastic pipe instead of tiles. The material comes in flat, wide sheets rolled on a drum. He says the machine is not expensive, only about Rs 16,000, but a heavy low-speed tractor with a draw bar pull of 10 to 12 tons at 1,000 feet per hour is necessary. The material is heated and then passes through a forming guide into the soil. It has a longitudinal slit in the bottom. The machine lays the material practically automatically at about a .2 percent grade. It is resistant to acid or alkali and is long lasting. He says that the drains may be laid at 2 to 5 feet depending on the crop but he favors at least 4 feet. The pipe has a diameter of 1½ inches and can discharge 5,000 cubic centimeters a minute. They should be placed 200 feet apart or less.

Janert emphasizes green manure for salty soil. Sun hemp and especially sesbania are mentioned. Tamarind is also good because of acid leaves. The German expert leaves after a bit of talk about the monkey he is taking home for his children. Then we have a short and frequently interrupted discussion about schedules.

At 4:00 we join the group for a conference with Mr. A. P. Jain, Minister of Food and Agriculture and his top staff. (We handed him a list of typed questions but he does not adhere to these very closely.)

Price supports: He says that the Government feels that these are necessary in principle but finds it difficult to work out an acceptable scheme. In India, any support price would need to be low - only high enough to prevent catastrophe. These would be so far

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below present prices that they might serve as disincentives. (I don't agree.) Then they would have the problem of relations between food grains and industrial crops.

He says talk about doubling production is not always clear. It is based upon lower production than now. They expect 71,000,000 tons this year and hope for 110,000,000 in 1967. He says they will have about 30,000,000 tons of rice this year, of which 25 to 30 percent is marketed. GOI will buy about 2,000,000 tons at a reasonable price to support the market. This is at Rs 15 per maund for low quality up to Rs 28 for the best. (But I think this comes too late to help the cultivators, and benefits the big farmers and middle men mostly.) Then he says they are starting a program of building godowns in the villages. A cultivator can take his grain there for storage in a larger market and get a negotiable receipt at reasonable prices.

He says that the final shape of village cooperatives is not clear. For some purposes, cooperatives may form a federation to get fertilizers, seeds, and the like. For credit the smaller society should function.

In commenting on developing combinations of practices he mentions the good work in Bombay State. He says that he knows that fertilizer and seed should go to the areas where other practices are also done best but some members of Parliament object and say that areas having the most get the most. He says that the gram sevaks are not adequately trained for farm planning.

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On efforts toward increased production he says they will have 4 new fertilizer plants producing by 1960-61. Much of their foreign exchange is already committed to partially completed plants and projects.

He hopes to have production targets for each block, for each village, and finally for each farm. He reacts favorably to the suggestion of trying a few blocks with one gram sevak for 5 villages and 2 agricultural officers for each block to see whether this system is more effective.

Mr. Jain talks of his own farm and says he has had good results with combined practices and those nearby are copying him. (I visited this little farm last year. See Indian Journal, 1958.)

Slaughter of animals. On this question he says religion is translated into politics. Even Nehru has said that a ban on slaughter is nonsense; yet public opinion is against slaughter. He agrees with the possibility of laws to limit and to confine bulls. We are told that the Supreme Court decided that cows cannot be slaughtered; but that other animals, including bulls, can be after certain ages where they are no longer useful. Mr. Jain says that it is the religious extremists in towns that oppose slaughter, not so much the cultivators.

This discussion continues with some other proposals of using carcasses for protein feed and so on. The Minister favors more small tractors, especially garden tractors, to reduce the need for bullocks.

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Time begins to run out so we don't talk much about the irrigation problem. He does say that State governments can now build field canals across one field to get to another. But he thinks responsibility for the local irrigation should be with the village panchayat.

He asserts that fertilizers and seeds should be distributed by the cooperatives.

We thank Mr. Jain as he leaves for another appointment. I doubt that he thinks so much of cooperatives but that he is under political pressure to follow Nehru's lead. Both cooperatives and land ceilings have become emotional with the Prime Minister.

We look at their economic exhibits for a few minutes. I talk privately with Secretary Damle about my proposal for price floors and ceilings, storage in villages, towns, and cities, and grain from the United States to get the whole scheme started. He is very enthusiastic and has been thinking along the same lines. He says the village godowns would cost Rs 750,000,000. If the United States would support 10 to 25 percent of this cost, the scheme might be carried through.

I come back to the hotel, change quickly, and go with Mommy to the home of Mr. P. R. Ahuja for tea. There were several guests and we have a pleasant hour. Then back to the hotel, notes, dinner, notes, read, and to bed.

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February 12

This morning I work awhile at the hotel; take notes to the office for mimeographing; buy a copy of the Rig Veda in Old Delhi; and return to the office at 10:45. I am able to do very little more on the schedule. After lunch we all go back for a meeting, during which we were supposed to outline briefly the points to be observed during the field trips. Each one discusses (a few not briefly) the check list of items that should be observed.

During one part of the discussion, Mr. Nehemiah tells us that recently the decision was made to allocate responsibilities within the village as follows: (1) The gram sevak to emphasize extension for production; (2) the cooperative society to obtain supplies; (3) the panchayat to be responsible for village administration. So far this is on paper only. Of course, membership will overlap between the cooperative leaders and the panchayat.

I check again about scheduling for my trips. So far some progress has been made and it has been confirmed that Dr. Raychaudhuri will go with us. I am back to the hotel for tea at 5:45.

About 7:45, along with Dr. and Mrs. Sherman Johnson and Dr. and Mrs. Harold Miles, we go to the home of Mr. C. R. Eskildsen, U. S. Agricultural Attaché. Also present are Dr. P. S. Deshmuk, Union Minister for Agriculture; Mr. Nasu, Ambassador for Japan in India; the Maharaja of Naligargh and his wife, Mr. and Mrs. Sinendra Singh; and Mr. and Mrs. Tarlok Singh of the Planning Commission. Dinner comes slowly. I have a nice talk with Ambassador Nasu. In his own country

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he is said to be a well-known agricultural economist. He has been to the United States several times and recently took 1,000 Japanese farmers there for training. His daughter married an American and lives in Colorado. He said that a group of their rice experts was recently invited to China. They said that the Chinese methods were inferior to those of Japan and that yields were considerably less than the Chinese reports, except for a few small "exhibition" fields. Mature plants were taken from other fields and transplanted into these. If I can spend a day in the field near Tokyo, he suggests that I go to Urawa City, which is the capital and prefecturial office of Saitama Prefecture, north of Tokyo.

As the servants start to serve dinner I outline briefly to Mr. Eskildsen, the scheme I have outlined in these notes earlier for a combined program of price supports; storage facilities in the villages, towns, and cities; and buffer carry-over stocks to take care of the bad years and to alleviate the fear of famine. To make this work the United States could contribute PL 480 funds for a significant fraction of the storage construction and free grain to help build the initial buffer stocks. He is enthusiastic and thinks the United States might go along.

He tells me that there is a "population" meeting here now and that William Vogt has asked to see him. I tell him about Vogt and suggest that he be very careful about what he says to Vogt.

he is said to be a well-known agricultural economist. He has been to the United States several times and recently took 1,000 Japanese farmers there for training. His daughter married an American and lives in Colorado. He said that a group of their rice experts was recently invited to China. They said that the Chinese methods were inferior to those of Japan and that yields were considerably less than the Chinese reports, except for a few small "exhibition" fields. Mature plants were taken from other fields and transplanted into these. If I can spend a day in the field near Tokyo, he suggests that I go to Urawa City, which is the capital and prefectural office of Saitama Prefecture, north of Tokyo.

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Shortly after dinner Governor Averell Harriman and his aide - a young economist - come in. Harriman completely takes over and asks a great many questions of Dr. Deshmuk, especially about his impressions of Red China, which he recently visited. Apparently the Governor doesn't hear well because he asks similar questions; but then he does not always get identical answers! Dr. Deshmuk says that some of the Chinese farms are very large and have many thousands of people on them, at least one had over 300,000. Not many live in dormitories because they don't have the buildings. He says that they do eat together. Mr. Torlak Singh tries to interrupt to say there is not much of this and that the Chinese villages are about like the Indian ones, but he doesn't get much chance to get through. It is said that people all wear the same kind of clothes, men, women, and children - a sort of blue cotton. Also they do go to work with the bugle. They are supposed to work at least 8 hours for their food, clothing, and exceedingly small wage. (He says about 6 rupees per month.) But then they do extra "volunteer" work up to 4 or 5 hours a day, running little smelters and so on. He thinks much of their enthusiasm is patriotism. They get no financial incentives but do, of course, get standing in the community.

Dr. Deshmuk is opposed to Communism, but he feels that they are on their way in China. He says India's problem is one of developing similar enthusiasm for work. Most people in Indian villages don't work a great deal and to succeed it is necessary that this vast mass of people do useful work. This is hard to arrange in a democracy without coercion. He says that the big trouble is that independence

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has not changed life in the villages much nor their relationship to government. The present Indian Government is essentially the same that they inherited from the British. Then there is talk about land reform and support prices. It seems that nearly all civil servants and most farmers want support prices, but the politicians are afraid of them and the civil servants haven't developed a good scheme. The Maharajah insists that the USSR and Red China have done a better job in mobilizing along definite lines and in advertising themselves than either the United States or India.

I am somewhat disappointed with Governor Harriman. I get a definite impression of superficiality and dogmatism quite unlike my impression of him in Moscow in 1945. Two or three times he said, "Russia has failed in agriculture and China has succeeded." One time I challenge him sharply on this and tell him he had better go back to the USSR and look at the farms now; nor do I believe the success stories about China. Ambassador Nasu tries to support this last point but he is too mild a man to compete with Harriman's brusque dominance.

We leave about 11:00 for the hotel. We are late to bed.

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CEK
February 12, 1959.

Kellogg: Soils and soil conservation

Outline of subjects of special interest

1. Soil conservation schemes, organization, financing, priorities, and relations to other agencies. (Soil Conservation Board, CPWC, DVC, Planning Commission, etc. and similar State agencies).

2. Special arrangements needed for great problem of waterlogging.

3. Soil conservation practices, in combination
   a). Water control
      (1) Irrigation
      (2) Drainage
      (3) Bunding
      (4) Gully Control
   b). Salinity and alkali control
   c). Fertilizers - kinds, supply, research, testing service, etc.
   d). Lime and gypsum, cost and freight rates
   e). Crop sequences (and mixed cultures)
   f). Organic manures and composts
   g). Farm and village forestry, especially for fuel.

4. Farm planning for optimum sustained production.

5. Land consolidation, especially in the dry areas needing bunding.

6. Soil survey and related research, and land classification.

7. Soil and water management research.

8. Reclamation and resettlement of new areas, and flood control.

9. Use of the bush fallow and shifting cultivation.

10. Training of soil scientists, farm planners, and conservationists, including more use of African research results in India. (Advanced training scheme already well started).

11. Factors outside the farms or villages that affect efficient sustained soil use.

    a). Price supports, storage, and local markets.
    b). Credit.

c). Cost-sharing for permanent soil management practices.
d). Technical assistance for water-management layouts and the like.
e). Extension education and demomstration is soil and water conservation.
f). Inspection of soil conservation (in broad sense) work financed by grants from Center.
g). The matter of bringing into use the many small and large areas of good unused land.
h). Licensing schemes for earth removal from good soils.
i). Development of local leadership for soil conservation programs in villages and groups of villages.
j). Schemes for controlled grazing.
k). Recognition and use of "cat clays".
l). Highway planning in relation to water flow and erosion.

February 13

Most are leaving for field trips this morning but I must go to a soil meeting at the IARI (Indian Agricultural Research Institute) tomorrow. After breakfast I write awhile, then go to the office and check on reservations. Dr. Parker says he has arranged a conference on soil conservation at the Ministry for 3:00 p.m.

About 11:00 I am back to my room and start writing. I finish a draft statement on shifting cultivation. In the meantime Mr. P. D. Nair, assigned to our team, calls. He says he is now a "free lance" and was, up to two months ago, Director of Agriculture in Kerala State where Mommy and I go next week. He wants to go with us. We talk a bit about shifting cultivation. I insist that much time is wasted in composting manure that has in it very little straw. He says that direct application encourages "white ants." I have heard this before and ask if there is any direct experimental evidence. He knows of none.

He says that holdings in Kerala are very small. They have 20 lakh acres of paddy, mostly in a narrow strip along the coast and in very narrow valleys. He wants to add 4 hours to go in a boat to see paddy on cat clay! We shall see. Then to lunch about 12:45.

After lunch Dr. Parker comes in. He says that a strong team of five in soil conservation are needed at the Center: (1) Group leader (vice Nixon); (2) training (Taylor); (3) soil scientist (soil survey); (4) agronomist; and (5) conservation engineer.

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He wants to look to the Soil Conservation Service in the United States for these men plus 3 or 4 good work-unit conservationists or area conservationists to be assigned to States. The newly sanctioned bunding projects on small catchments should be in dryland areas where big responses can be had. With good U. S. help they can be real demonstrations. These should be tied into the colleges for their mutual benefit.

On the way to the Ministry Parker says that Minister Dey is not only an empire builder but also has high hopes of following Nehru as Prime Minister. He says also that Minister Dey and Dr. Ensminger are very close.

We go to the office of Dr. B. N. Uppal, Agricultural Commissioner of the ICAR. Dr. Uppal says that they will have a big arid zone laboratory at Jodhpur with a grant from UNESCO. I understand that GOI will spend Rs 1 crore on this. I wonder if this is a wise expenditure.

Dr. Parker points out the need for making plans about the number of people required from ICA in soil conservation. Dr. Uppal says they are planning on a very large expansion in soil conservation for which they do not have staff. In the third 5-year plan they expect to have Rs 150 crores for soil conservation, including land development and soil drainage. Then they estimate Rs 50 crores for farm forestry. This would mean about 1/8 of the total planned budget for agriculture. Besides they plan Rs 25 crores for land consolidation and Rs 330 crores for minor irrigation. I really don't see quite

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how they are going to spend these funds wisely. Most of the funds will be grants-in-aid to the States. Some like Bombay State have experience and organization, many do not.

We discuss the need for regional staffs for the inspection of the work - something that I strongly recommended last year. Dr. Uppal thinks they should go further and have a staff for appraising schemes and helping the States develop schemes. I agree provided that such staffs do not become an intermediate administrative office between the States and the Center. He suggests regions by broad soil groups and Parker suggests one in each State. I don't like either proposal very well; I am afraid the former will be confusing to the States and the latter will lead to provincialism. Dr. Uppal asks me to work out something with Dr. Basu.

Dr. Parker tries again to get him to be specific about TCM (or ICA) help on soil conservation for the next five years. He points out that it takes nearly a year to get people on the job and that he would like to get the matter settled before he leaves. But Dr. Uppal is very cold on the matter. He says, "Let's wait until Dr. Kellogg has been here longer." Finally he agrees to a conference at 10:30 Saturday, February 28.

Dr. Parker leaves and we start to talk about shifting cultivation. To my surprise Dr. Uppal is quite interested in this subject and has even written something about it. From what he says we seem to be in agreement. He also knows quite a bit about the corridor

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system in the Congo. He gets enthusiastic and this does the trick.

He sends for Dr. Basu to come on the double. Along with him comes Mr. Khemchandani, Deputy Director of Soil Conservation for Agriculture, and Mr. V. Subaiyer, Deputy Director for Engineering. Dr. Raychaudhuri soon joins us. He lectures Basu strongly that he must get busy to figure out the TCM requirements and puts forth a strong statement along the very lines that he refused to discuss with Dr. Parker and me a half-hour earlier. He tells Basu about the conference on February 28. Dr. Basu says he is sorry but he has a meeting in Dehra Dun. Dr. Uppal says, "This is more important - you be here." Dr. Basu mumbles that he will make rearrangements.

Then we get to talking about my schedule and he orders Dr. Basu to arrange a better hotel for me in Mysore. Then he goes ahead and lays out a plan for my 3 days in Assam that would take better than a week besides traveling in regions of hostile tribesmen that the Assam police cannot control. Basu objects. Dr. Uppal says, "Revise the program. You are more worried about yourself than Dr. Kellogg."

Tea is brought and the discussion becomes more general. We leave about 5:30. In the hall Basu is a bit worried. We meet one of the officers from Assam and he thinks part of Uppal's plan is impracticable. So we'll discuss it tomorrow. Dr. Raychaudhuri takes me back to the hotel in his jeep.

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Then notes, dinner, notes, bake, read, and to bed.

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THE STATESMAN, 13 FEBRUARY 1959

FARMERS' CONSENT ESSENTIAL FOR JOINT CULTIVATION

Nehru Intervenes In Rajya Sabha Debate

Mr Nehru on Thursday appealed for the co-operation of all parties and people for the implementation of the developmental plans and said: "The broader tasks before us are not party tasks but national tasks and, therefore, in this tremendous adventure we seek the co-operation of all".

The Prime Minister was intervening in the Rajya Sabha during the course of the three-day debate on the President's address to the two Houses of Parliament.

Mr Nehru said that India would be able to cross the barrier of an underdevelopment country and launch into a period of self-development at the end of the third Plan. The next seven years, Mr Nehru emphasized, required "organized", united and continuous effort..

Mr Nehru added: "All these great programmes that we see in perspective all around us cannot be realized without a very great deal of co-operative effort. No Government, however wise and well-meaning it might be, can succeed without that co-operation and I do not presume to say that the Government I have the honour to preside over is so wise and so brilliant as to solve all the problems in India. In the measure we succeed it is only because for the co-operation received from the people of India and I do appeal to this House and others outside that while we have every right to hold our opinions and criticize Government's policies the broader tasks before us are not party tasks but national tasks. Therefore, in this tremendous adventure we seek the co-operation of all."

FOOD SITUATION

In a reference to the food situation, he said that the Government was far from being complacent. After two very bad years the country was beginning to turn the corner with a good rice crop and an expected good wheat crop. The Government had also come to some important decisions; first, in regard to State trading and, secondly, some other matters not directly but undoubtedly connected with programmes of food production and distribution.

Mr Nehru said: "On State trading in foodgrains, let me repeat what my colleague has said. We are completely in earnest about it and we are going to pursue it to the end. But we had pointed out then that while we came to this decision we had no real apparatus for it and, therefore, inevitably we have to deal with, and licence and authorize, some of the old wholesale dealers and to buy foodgrains on behalf of the State.

"This is not a very satisfactory arrangement. We cannot easily control all these wholesale dealers. Secondly, it is obvious that they do not like this change in our policy. When you make any individual or group responsible for carrying out a policy which is not his, difficulties arise. But there is no help for it at this stage for us. If we had developed our co-operative organization, as we hope to do in future, all these difficulties will diminish and ultimately fade away completely. So from this point of view also, apart from others, we should develop co-operatives in the villages and elsewhere."

CO-OP. FARMING

Mr Nehru said that a great deal of argument had been raised about joint cultivation. What they had said was that they proposed to have service co-operatives in every village in India and a union of co-operatives above that.

"We have said our objective is joint cultivation which we hope will come naturally with the approval and consent of the farmers. But we are going to concentrate on the service co-operatives for obvious reasons, practical as well as other."

Mr Nehru said that in the conditions of India with innumerable small holdings it was essential to form larger units to enable the application of modern techniques. This could only be done through co-operation.

If these service co-operatives were spread out all over the country, and with joint cultivation here and there, the example and results flowing from that joint cultivation would be greatest argument in favour of it.

Mr Nehru said that even now there were in the country some hundreds, possibly 2,000, joint cultivation farms. He had no figures as to how every one of them had done but some of them he knew had succeeded very well.

"We are at the present going through a process of change, transition, when we are up against naturally many individuals and groups, classes if you like, who do not like this change and therefore they criticize it. I am not imputing any motives to them, but they criticize it because they do not like a certain change and are convinced such a change will not be for the good of the country. But I am merely pointing out the difficulties we have to face when we have to function through the very agency which does not like what is happening. It is an illogical position but there is no help for it. Any other attempt to put an end to it will mean temporarily to have no agency at all and some kind of chaos on the food front. That has been our difficulty."

Fortunately, Mr Nehru continued, the country had a good rice crop and there was every prospect of a good wheat crop later. "So we have an opportunity of changing over under relatively fair conditions and we shall be able to build up large stocks of foodgrains and meanwhile develop these co-operatives through which we shall deal."

But meanwhile, even though temporary, the high prices of wheat were very depressing. Steps should be and were being taken to deal with the situation. "I regret that in this matter we do not get the co-operation of many people in business who hoard or expect higher prices or sometimes who wish to exercise pressure on the Government or other agencies so that prices may be raised. All that is happening. Fortunately this cannot be of long duration. By the end of next month, when the new crop comes in, this policy will not help those who are hoarding."

February 14

The bearer brings tea at 6:45. So I am up early. After breakfast Dr. Govindanrajan comes at 8:30 and we go to the IARI. On the way he tells me that there is a great lag between the development of irrigation and the use of water by the cultivators. He says this is especially so with some new projects in Orissa. I agree that agricultural development and education should start at the same time work is begun on the dam.

We come to the IARI about 8:40. I look around the laboratories most of which are not very clean. Dr. Raychaudhuri comes at 9:10 and we look at the cartographic laboratories. They have installed somewhat more of the elaborate equipment; but much of it is still unpacked as it was a year ago. The huge printing press is set up but is still unused for want of electrical connections. They are using, a little, the letter press and the waxing machine. The small projector is used quite a bit and some use is made of the ozalid machine. They have built part of the tanks for developing photographs but still have not installed the big camera. (Actually this should be transferred to the Survey of India but I know they won't do it, if they can avoid it.)

Dr. Raychaudhuri tells me that they have accepted my recommendation that the main work be done at the Survey of India and that only the small jobs be done here. He says that they will have small cartographic units in the other three correlation headquarters.

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February 14, 1959. C.E.K. and Dr. S. P. Raychaudhuri.

Pictures are taken of the group including the soil correlators and then we go to the Ministry of Food and Agriculture for a formal meeting of the Technical Subcommittee of the All-India Soil Survey. Besides the soil survey staff there are the three directors of soil conservation, Mr. Hoon from the CPWC, and Dr. Agarwal from Kanpur.

They begin by discussing the draft manual and I go over many of the points that I made in my recent criticism of this draft. Then we discuss the arrangements for engineering characterization of the soils.

I am told that action has been taken on my recommendation for licensing those making bricks. A questionnaire has been sent to each of the States, along with that part of my report, with a view to a new law by the All-Union Parliament.

Some of the discussion is a bit unorganized with as many as four people speaking emphatically at the same time. The meeting breaks up a bit after 12:00 and one of the jeeps brings Dr. Agarwal and me to my hotel. We have a leisurely lunch and a good talk in the garden.

He tells me that in U. P. gypsum is carried on the railways at the same rate as fertilizer and that they were successful in getting a concession for these to be carried at one-quarter the usual rate.

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at the same rate as fertilizer and that they were successful in
getting a concession for these to be carried at one-quarter the
usual rate.

S.V. Rama Rao,
rector Soil Cons.(E)

No.DSC(E)/59

GOVERNMENT OF INDIA
MINISTRY OF FOOD & AGRICULTURE
(DEPARTMENT OF AGRICULTURE)

New Delhi the 16th Feb.1959.

Dear Dr. Kellogg,

As desired by you I enclose herewith two copies of the questionnaire issued by this Ministry to the State Governments in connection with Soil Destruction through removal of soil for brick kilns.

Yours sincerely,

M.S.V. Rao

(M.S.V. Rama Rao)

Encls.2.

Dr.Charles E.Kellogg,
Claridge's Hotel,
Room No.107,
New Delhi.

including the soil correla-
of Food and Agriculture for
Committee of the All-India
y staff there are the three
Hoon from the CPWC, and

aft manual and I go over many
nt criticism of this draft.
engineering characterization

taken on my recommendation for
sationnaire has been sent to
part of my report, with a view
ment.

unorganized with as many as
the same time. The meeting
of the jeeps brings Dr. Agarwal
rly lunch and a good talk in

m is carried on the railways
at the same rate as fertilizer and that they were successful in
getting a concession for these to be carried at one-quarter the
usual rate.

QUESTIONNAIRE ON SOIL DESTRUCTION THROUGH REMOVAL OF SOIL FOR BRICK KILNS.

Name of the State:- _____.

1. Approximate number of brick kilns in the State.
   (a) Number of kilns in urban areas.
   (b) Number of kilns in rural areas.

2. Total area affected by the brick kilns. (in acres)
   (a) Area affected in urban areas (i) in Agricultural lands and (ii) in non-Agricultural lands.
   (b) Area affected in rural areas (i) in Agricultural lands and (ii) in non-Agricultural lands.

3. Average depth to which soil is usually dug up for this purpose? (in feet)

4. How much additional area is utilised every year for brick kilns?

5. Whether any steps are taken to fill up the pits formed by removal of soil for brick making?

6. Are there any licensing systems or rules to regulate the work; if not what is the procedure adopted?

7. What are the suggestions of the State Government to restrict/regulate this work in their State, so as to prevent destruction of valuable lands on this account? In this connection the following information may also be furnished:—
   (a) depth to which soil may be allowed to be dug up with reasons therefor.
   (b) can the abandoned brick kilns be used for agriculture or for pisciculture.
   (c) what precautions can conveniently be taken by way of vegetative, mechanical or other methods for protecting the lands (e.g. fencing, easing of slopes, turfing etc.).
   (d) would it be desirable to have legislation making it incumbent on the owner of land who leases the same for brick making and/or brick manufacturers to carry out the above measures? If not what alternative method would the State Government suggest?
   (e) any other suggestions the State Government may like to make.

EXTRACTS OF PARA 31 OF DR. KELLOG'S REPORT.

31. It is highly recommended that a high-level group of soil scientists, engineers, and geologists, with legal assistance, study the very serious problem of soil destruction through removal of material for making bricks. Lakhs of acres of some of the best soil in India have been ruined, needlessly, by the removal of 2 or 3 feet of surface soil from large areas. This highly destructive process now goes on at an accelerated rate. Large areas in the great plain of Northern India have been so ruined. The surface soil has been removed down nearly to the water table. Salts accumulate and the soil becomes worthless for any use. Reclamation would require deep drainage ditches and reworking of the soil into raised beds.

Certainly places can be found for taking out material to far greater depths, thus distrubing much less total surface and leaving useful ponds for water storage and for fish.

It is recommended that a special technical service be developed for locating suitable places for taking material for bricks without the destruction of such vast areas of excellent soils. The good agricultural soils should be protected from destruction by appropriate use of the police power and taxing power of the State. The problem is serious because many of the soils being destroyed are among the most productive, potentially, in the world.

****

'R.S.'
13-1-59.

Dr. Agarwal is a bit worried about the soil survey program and I agree that the staff does not yet really understand it. He feels that Community Development is trying to do altogether too much. He says the village-level workers are supposed to do everything and actually do very little. He agrees fully with the plan I have already outlined for moderate price supports, storage facilities, and carry-over stocks.

We continue this discussion about many phases of this food program until about 2:45 when he leaves.

I pay the hotel bill for the last week, catch up on my notes and begin to pack.

(Unhappily, I lost my notebook late in the evening of February 16 so that the text of the Journal from this point to 9:00 p.m. February 16 is reconstructed from memory late that evening, with assistance from Dr. Raychaudhuri.)

Dr. and Mrs. Parker come for a short visit; they have dinner with us, and leave about 9:00 after Frank and I discuss a draft of his final statement to the Government of India before leaving for his new post in Rome. At 9:30 we leave the hotel to go to the airport where Dr. Raychaudhuri and Mr. P. D. Nair join us. We are in the air for Madras at 11:15 and one day passes into another.

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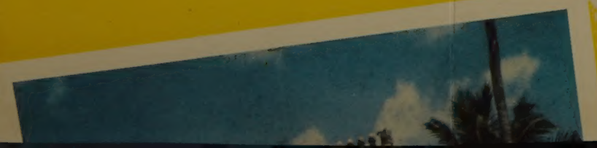
Tourist Map of India (South Part)

A bird's-eye view of Bombay from Malabar Hill

Temple at Budh Gaya



LAND AND PEOPLE

India is vast, varied and interesting. She is two-thirds the size of Europe excluding Russia, or six times as big as France. She measures 2,000 miles from Kashmir in the north to Cape Comorin in the south and about the same distance from east to west. Within her land frontiers of 8,200 miles and a coastline of 2,900 miles are to be found climatic conditions, scenery, vegetation, people and customs as diverse as those of Europe.

The three geographical regions of India—the Himalayas, the Indo-Gangetic plain and the Deccan plateau—have delicately varied natural settings. The snow-clad, undulating Himalayan range, with Everest as the world's tallest peak, forms the northern region. The triangular Deccan plateau in the south has the Vindhya hills for its base and the sea on the two other sides. Great rivers rise in the lush green Western Ghats, flow across the peninsula, and find their outlets through the much broken Eastern Ghats. In between the plateau and the Himalayas lie 1,200 miles of the Indo-Gangetic plain, the cradle of Aryan civilization. This fertile and densely populated area is watered by the Sutlej, the Ganges and the mighty Brahmaputra which rise in the Himalayas and have sustained the people of this region through the ages.

The seasonal rhythm dominates the life of the people. The bracing cold weather lasts from November to February and the hot weather from April to June. Towards the end of June the monsoon from the Bay of Bengal and the Arabian sea bursts over the country transforming her dry parched land into a vast expanse of glistening beauty and verdure.

It is this diversity which makes India so interesting. The unity of the country is, however, deep and abiding. Blending with regional nuances the people have many common traits; they have the same tolerant attitude to life and a common cultural heritage.

INDIAN ITINERARY

India is covered by a network of communications and all the important places can be reached by road, rail and air. The Indian railway system is the largest in Asia and the second biggest State enterprise in the world. You can travel by air-conditioned coaches attached to the mail trains on the main lines. The fare and freight rates are considerably less than in Western Europe. The Indian Railways have a reputation for efficiency and punctuality. Most of the places worth seeing are covered by airlines which are State-owned.

To assist the tourist the country has several travel agencies recognised by the Government. Tourist offices have also been opened by the Government at Bombay, New Delhi, Calcutta, Madras, Srinagar, Agra, Banaras, Bangalore, Simla, Darjeeling, Ootacamund, Aurangabad, Jaipur, London (U.K.), and New York and San Francisco (U.S.A.)

WESTERN REGION

Bombay, the "Gateway of India" and the principal town of this region, provides the tourist coming by sea with the first glimpse of the country. It has a beautiful harbour studded with hilly islands and a palm-fringed shore which rises gradually to the peaks beyond.

Besides being the chief entrepot of India, Bombay is also a great industrial centre.

At Mahalaxmi, Bombay has the best race course in Asia. On a small island decked with tropical flora are the famous cave temples of Elephanta dating back to the eighth century. From Bombay, the tourist can conveniently visit the caves of Ellora and Ajanta, which constitute some of the most remarkable monuments in India. Excavated in the scarp of rock plateau the cave temples of Ellora are of Hindu, Buddhist and Jain origin. The most remarkable of these is the Kailasa Temple 164 feet in length, 109 feet in width and 96 feet in height scooped out of a solid rock. It is lavishly carved and sculptured with life-size animals and images of gods and goddesses.

The Buddhist cave temples of Ajanta, some of which are 2000 years old, lie in a narrow gorge and form a stupendous cave picture gallery unique in the history of art. Nowhere in the world is there such an admirable combination of architecture, painting and sculpture.

Bijapur, in Bombay State, was once the splendid capital of a powerful sixteenth century Muslim State. Its architecture combines grandeur, grace, as well as ornametation.

the river Yamuna. The Taj Mahal built by Emperor Shahjahan in memory of his beloved wife Mumtaz Mahal, is known throughout the world for its pierced marble work and beauty of proportion.

Jaipur, chief city of a former princely state and now the capital of the State of Rajasthan, is also a few hours journey from Delhi and is known as the "Rose-pink city of India". In the heart of the city stands the palace with beautiful gardens and pleasure grounds surrounded by a high embattled wall.

Lucknow, the capital of Uttar Pradesh and the proverbial "Garden City" abounds in places of historical interest and legendary glamour and has its own peculiar culture.

Sprawling along the left bank of the river Ganges, Banaras is the most ancient and holy city of India. Its array of shrines, temples and palaces rise in several tiers from the bank of the river. Banaras is famous for its brocades and brass work.

Five miles from Banaras lies Sarnath. Buddha delivered his first sermon at Sarnath expounding the four Noble Truths. The famous Asoka Pillar whose Lion Capital has been adopted by the Republic of India as the State emblem, can be seen in the Sarnath Museum.

Khajuraho, in Vindhya Pradesh in Central India, is known for its magnificent temples of the tenth century. The temples are unrivalled for the profusion of elegant carvings. Birds, animals and women in delicate poses, carved with imagination, are more beautiful than in life itself. Of the many ruins that lie scattered over a vast area the temple of Kandariya Mahadev, which contains about 800 statues, is the most famous.

North-west of Delhi, a few miles within India's border, is Amritsar known for its Golden Temple, the most sacred shrine of the Sikhs.

The great arc of the Himalayas, swinging sixteen hundred miles across Asia, forms India's northern border. Nestling in the bosom of these mountain ranges lies a large number of beautiful mountain resorts which can be easily reached by motor car. They have good hotels and shopping centres and the more important ones like Simla, Mussoorie, Nainital, Darjeeling and Shillong offer all the modern tourist amenities. In the extreme north-west is the world famous Kashmir valley 95 miles long and 35 miles broad, rightly called the tourist's paradise.

Srinagar, the capital of Kashmir, lies along the banks of the Jhelum, its waters crossed by seven bridges. A trip down the river in a swiftly gliding shikara gives a beautiful view of the city's quaint balconies, busy ghats, mosques and temples.

Nearby is the Dal Lake where a charming holiday can be spent in a house-boat. All round the lake are lovely pleasure gardens, laid out by the Moghal Emperors, against the background of steep mountains.

Gulmarg, 30 miles from Srinagar, is 8,700 feet high and is known for its lovely golf-course and winter sports. Other health resorts are Khilanmarg, the botanist's paradise; Pahalgam, enroute to sacred Amarnath; Kokarnag, noted for the refreshing waters of its springs; Achhabal, with a large spring and Wular lake, one of the largest fresh water lakes in India.

Rivalling the vale of Kashmir in beauty, the twin valleys of Kulu and Kangra offer unsophisticated charm. Green with apple orchards and strewn with ancient Rajput forts on the summits of immense crags, well-nigh impregnable in olden days, with snowcapped mountains in bold relief against the skyline, these valleys provide some of the best visual feasts in India.

CENTRAL REGION

Gwalior, the capital of Madhya Bharat, is rich in historic associations and architectural beauty. The magnificent Gwalior Fort, about 2 miles long and 2,700 feet across, is one of the most impressive medieval strong-holds in India.

Fifty-eight miles from Mhow, on the crest of an offshoot of the Vindhyas, lie the ruins of Mandu, the "City of Joy". The capital of a powerful Afghan dynasty for more than a hundred years (1436-1561). Mandu has lovely palaces, swimming baths, towers and the famous Rupmati Pavilion, looking down on the plain of Nimar, 1,200 feet below.

About 616 miles from Bombay is Jubbulpore, one of the important cities of Madhya Pradesh. It is famous for its Marble Rocks, 13 miles away at the bottom of the gorge of the river Narmada.

About 7 miles from Wardha railway station is Sevagram where Gandhiji lived and worked for many years. In this Ashram (hermitage), founded by him, live men and women dedicated to a life of service.

where Rabindranath Tagore, the great poet of India, founded the
a new experiment in education and a centre of Indian culture.
all over India and overseas.

Shillong is the capital of Assam, the hilly state in the east
picturesque wooden houses, precariously balanced on hills
flowers. From Shillong one can see the Naga and Khasi hill
Their costumes, customs and dances are extremely colourful.

Buddha Gaya, in Bihar State, is famous for the Bodhi tre
attained enlightenment. This holy spot is marked by an ancient

A night's journey away from Calcutta by rail is the seaside
being a popular health resort, Puri is famous for the great tem
dominates the landscape for miles around.

Fifty-four miles by road, north-east of Puri, along the sea-coast
gem—the Konarak temple dedicated to the Sun God.

Bhuvaneshwar, the capital of Orissa, had 7,000 temples on
than 500 now remain. Exquisitely carved, they are amongst
exhibit a variety of architectural styles.

SOUTHERN REGION

Madras, the third biggest city of India, is the gateway to the
of exquisitely carved temples. Unlike India's other towns, it
world charm, without lacking the amenities of modern life.

About thirty-seven miles from Madras via Lattice Bridge,
on the seashore is a group of remarkable rock-hewn mon
historians to the eighth century—monolithic temples, figures and

Also, within easy reach of Madras is Kanchipuram, the
architecture and sculpture of its shrines record the progress
of South Indian art.

Tiruchirapalli or Tiruchi, further south, has a temple built
abruptly from the plain to a height of 273 feet. Only three
stands the temple of Vishnu, the largest and richest in southern

Ninety-six miles south of Tiruchirapalli is Madurai which
Tamil learning and culture. The magnificent Meenakshi temple
produce varying notes when tapped.

Further south, on an island near the extreme south-eastern
amidst wavy palms and glistening sands, stands Rameswaram,
places of the Hindus.

Having visited the east coast, the visitor moves to the west
with dense jungles, deep ravines, peaceful lagoons, gliding
fringed shore—all form the smiling land of Malabar. Here the
beasts, and on the land skirting the Periyar lake a game sanc
Moving in a boat on the lake the visitor can at times see
banks, quenching their thirst.

Trivandrum, the capital of Travancore-Cochin, about 2
modern city with fine buildings perched on hills and parks.

To the north-east of Malabar are the Nilgiri hills known
In their midst lie several pleasant hill-resorts of which
Ootacamund (7,500 ft.) which has the appearance of a vast park

To the north of the Nilgiris lies Mysore. This lovely State
planned cities, ornate shrines, large primeval forests, water
city of Mysore has lovely parks and open places, and the palace
the old fort is admittedly one of the most beautiful buildings

In the centre of the southern peninsula is Hyderabad. A
Hyderabad city are the Char Minar known as the Arc de
Falaknuma Palace and the Mecca Masjid.

HANDICRAFTS

India is one big bazaar, a paradise for shoppers and
and crafts have always been prized abroad. An instinctive
patience and the accumulated experience of centuries enable
produce goods of rare excellence and design. Kashmir

February 15

We stop in Nagpur for about an hour and change planes for Madras. We are down in Madras about 6:15. We have breakfast in the airport and Dr. Raychaudhuri takes the early plane to Cochin. With Mr. P. D. Nair, we ride up town with some of the Air India people and hire a taxi for a little trip around the city. I take photos of the University and of the Gandhi Memorial. We go back to the airport a little after 9:30. Dr. Kelley comes in and he, Mr. Nair, Mommy, and I leave about 11:15 on the plane for Cochin. We stop briefly in Bangalore and again in Coimbatore. Around Bangalore one sees a good deal of rather recent gullying. Much of which has been caused by poorly placed highway grades and culverts and by broken field bunds.

The rough land north of Coimbatore is partly outliers of hard rock and partly due to deep dissection. In places there are two old terraces between the mountains above and the narrow valley bottoms below.

Beyond Coimbatore we pass for a long way over an undulating plain of reddish soil becoming somewhat darker as we go on. A part is irrigated, but much is used for Kharif crops. We come then into rough, hilly land, which appears to have mainly scrub forest with the odd clearing. I see a few small fires suggesting minor shifting cultivation. As we go on west the sloping plain has a very curious fairly strong mezzo-relief with low reddish hills separated by curving flat valleys used for paddy. Some of these flat, low, bunded valleys are fairly wide and others are very narrow. They

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Harda
Bairi
Harsud
Rahatgaon
Shāhpur
Chicholi
Bardha
Parāsia
Amarwāra
Barkuhi
CHHINDWĀRA
SEONI
Lāmta
Bailhar
BETŪL
Aulia
TĀPTI
Bhainsdehi
Multai
Chānd
Rāmakona
Ramrama
Katāngi
Tirodi
BALĀGHĀT
KHANDWA (NIMĀR)
Harisal
Atner
Bāndhatna
Morsi
Sadoti
PENCH
Rāmtek
Tumsar
Rajegaon
Gondia
Sukli
Chikalda
3649
Ellichpur
Wasoli
Anjangaon
Ashti
Kātol
Kamptee
BHANDĀRA
NAGPUR
Kondhāli
Dongargaon
Jālgaon
Akot
Arvi
Sakoli
Deori
Daryāpur
AMRAOTI
Nandura
Shegaon
Badnera
Dhamangaon
Kelihar
Umrer
Pauni
Chīchgarh
Hāt Banjari
AKOLA
WARDHA
Murtazapur
Samudrapur
Kurkhera
Nāgbhir
Pātur
Kāranja
Rālegaon
Hinganghāt
Chimur
Armori
Angāpur
YEOTMAL
Pohna
Mangrul Pir
Dārwha
Warora
Mahurli
Agarjhari
Garhchiroli
Mānora
Ghatanji
Mehkar
Bāsim
Arni
Pandharkawada
Wūni
Mul
Risod
Lonār
Pusad
Chūgus
CHĀNDA
Balhārshāh
Bethia
PENGANGA
Bori
Rājura
Hingoli
ĀDILĀBĀD
Ashti
Jintur
Umarkhed
1356
Kinwat
Kundah
Hadgaon
Alāpillai
Chondi
Utnūr
Āsifābād
Āsifābād Road
PARBHANI
Boath
Tandūr
PRĀNHITA
Pāthri
NĀNDER
Purna
Bhalsa
Nirmal
GODĀVARI
Mudhol
Gangākher
Kandahār
Jagtiāl
Mancherāl
Chinnūr
Sironcha
Bhopālpatnam
Purli
Bāsar
Ārmūr
Mālegaon
NIZĀMABĀD
Peddapalli
Manthani
Ahmadpur
KARĪMNAGAR
Rāmareddi
Sirsilla
Chākūr
Latūr
Udgir
Kāmareddi
Nāgaram
Mulug
Chelvai
Siddipet
Yellareddi
Hasanābād
Parkāl
NIZĀM SĀGAR
Akanapet
WARANGAL
Medak
Kazipet
Cherial
Narsampet
MĀNJRA
BIDAR
Andol
Jangaon
CENTRAL RAILWAY
Naldrug
Homnābād
Sadāseopet
Medchal
Yellandlapād
Zahirābād
Bhongir
Dornakal
SANGAREDDIPET (MEDAK)
SECUNDERĀBĀD
Chincholi
Vikārābād
HYDERĀBĀD
Narkatpalli
Suriapet
KHAMMAM
GULBARGA
Tandūr
Pargi
Ibrāhimpatan
NALGONDA
Korangal
Shādnagar
Kodār
Wādi
Mirialgūda
Jaggayyapeta
Sindgi
Koilkonda
Yādgir
Jadcherla
Shāhpur
MAHBŪBNAGAR
1636
Devarkonda
KRISHNA
Dāchepalle
Narāyanpet Rd
Amarāvati
BHĪMA
Tālikota
Mahikal
Manānūr
Mācherla
Kistna
Wanparti Rd
Kothakota
Srigiripādu
Narasaraopet
GUNTŪR

twist and wind around in curious shapes. Many of the low reddish hills are surrounded by them. The hills have open cultivated areas and both palms and trees. As we near the coast one sees lots of coconut palms and areas of both dry and wet paddy land.

We reach Cochin about 2:40 p.m. It seems very hot here. We are met by Dr. M. S. Nair, Joint Director of Agriculture for Soil Conservation in Kerala State. He is a graduate of Ohio State University. We also meet Mr. N. S. Vaidyanathan, a local irrigation engineer, who takes Dr. Kelley to Trichur for the night.

After a considerable wait we are taken to the Malabar Hotel directly on the harbor. We are both very tired and try to nap. Mommy succeeds and I fail.

We go to bed directly after dinner.

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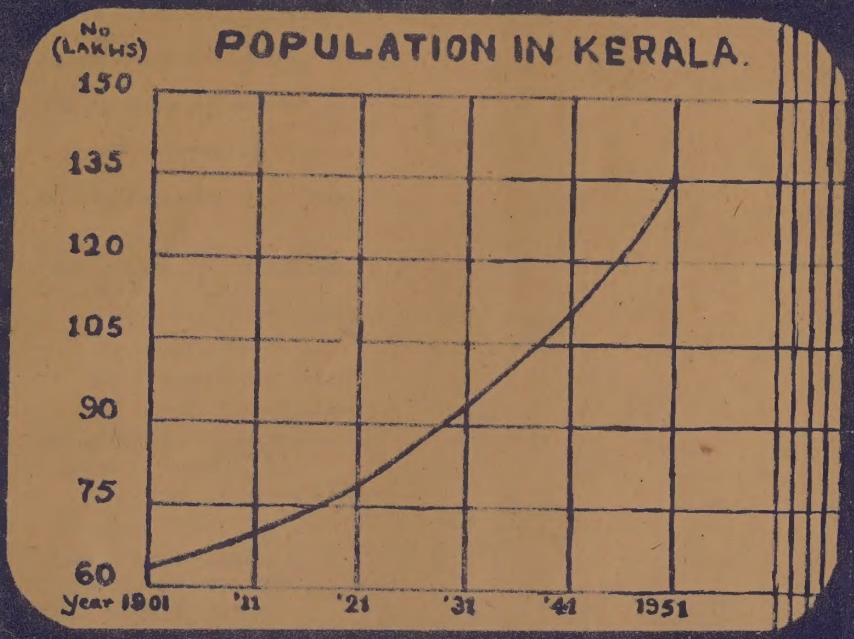
GOVERNMENT OF KERALA

KERALA
AT A GLANCE.



ISSUED BY THE

DEPARTMENT OF STATISTICS

1959.

FACTS ABOUT KERALA

Location :

(i) North Latitudes — Between 8°—18' & 12°—48'

(ii) East Longitudes — Between 74°—52' & 77°—22'

Area	14,992 Sq. miles.
Total Population (1951 Census)	1,35,51,529
Density (1951 Census)	904 per sq. mile
Rural Population (86.5 percentage of the total) (1951 Census)	1,17,21,791
Urban Population (13.5 percentage of the total) (1951 Census)	18,29,738
Male Population (1951 Census)	66,82,925
Female Population (1951 Census)	68,68,604
Sex Ratio	1,028
Agricultural Population (1951 Census)	72,70,161 (53.6 per cent of the total)
Non-Agricultural Population (1951 Census)	62,81,368 (46.4 per cent of the total)
Literate Population (1951 Census)	54,73,765 40.4 per cent of the total)
Illiterate Population (1951 Census)	80,77,764 (59.6 per cent of the total)
Estimated Population for 1958	15,230,000
Total Live-stock population (1956 Census)	41,68,237
Total Poultry (1956 Census)	67,95,045
No. of Schools for General Education (as on 1-2-1958):	
(i) High Schools	826
(ii) Upper Primary Schools	1756
(iii) Lower Primary Schools	6973
No. of Colleges and Institutions for Higher Education (as on 31-3-1958):	
(i) Arts and Science Colleges	44
(ii) Others	48
Electricity generated (1956-57)	36,35,45,600 (K.W.H.)
No. of Medical Institutions (1956-57)	365
Road Mileage (1955-56)	10,740 miles.
Route Mileage of railways in the State (1956-57)	465 miles.
Number of ports and harbours	11
Coastal line	340 miles.
No. of markets and mundis (1956-57)	1935
No. of Veterinary Institutions (1956-57)	104
No. of Joint Stock Companies (on 31-3-1958)	1234
No. of Trade Unions in the State (as on 31-3-1958)	1220
No. of Libraries in the State (1956-57)	2057
No. of Motor Vehicles in the State (1956-57)	13457
No. of Registered Factories in the State (31-12-1957)	1650
Forest area in the State (1956-57)	24,58,400 acres.
Net area sown (1956-57)	45,25,100 acres.
Total cropped area (1956-57)	54,64,500 acres.
(1) Area under food crops	37,42,100 acres.
(2) Area under non-food crops	17,22,400 acres.
Net irrigated area (1956)	8,11,100 acres.
No. of Income tax assessees in the State (1956-57)	11,293
Total tax (Income-tax, Super-tax and surcharge) payable (1956-57)	Rs. 4,17,45,383.

Age Distribution of Population in Kerala State (1951)

Age Group		*No. of persons (in lakhs)*	*Percentage to total*
All ages	..	135.52	100.00
Below 5 years	..	19.27	14.20
5—14 ,,	..	32.88	24.30
15—24 ,,	..	27.80	20.50
25—34 ,,	..	19.13	14.10
35—54 ,,	..	25.36	18.70
55 and above	..	11.08	8.20

Distribution of Population in Kerala according to Religion
(1951 Census)

Religion		*Total*	*Percentage to total*
All Religions	..	13,551,529	100.00
Hindu	..	8,360,596	61.70
Muslims	..	2,202,774	16.25
Christians	..	2,935,385	21.66
Sikhs	..	308	..
Others	..	52,466	0.39

KERALA STATE—AREA AND POPULATION (*District Wise*)

District	Area (Square Miles)	Number of Taluks	Number of Villages	Number of Towns	Number of Municipalities.	Number of Panchayats.	Population (1951 Census)			Density of Population.
							Total	Rural	Urban	
Trivandrum	846.3	4	94	21	3	70	1327812	1020679	307133	1569
Quilon	1981.9	6	99	9	1	87	1484783	1342142	142641	749
Alleppey	703.9	7	99	10	5	93	1512079	1285331	226748	2148
Kottayam	2000.0	8	101	13	4	76	1328515	1169647	158868	664
Ernakulam	1558.5	7	112	14	6	94	1530143	1263079	267064	982
Trichur	1147.0	5	244	10	3	78	1362765	1198583	164182	1188
Palghat	1973.1	6	302	10	2	112	1565167	1394771	170396	793
Kozhikode	2554.4	6	332	7	1	85	2065184	1796962	268222	808
Cannanore	2226.5	6	250	2	2	197	1375081	1250597	124484	618
Total	14991.6	55	1633	96	27	892	13551529	11721791	1829738	904

Area & Population (Kerala State)
Varitaion of Population during the last fifty years.

Year	Area in Sq. Miles	Population (Lakhs) Total	Males	Females	No. of Women per 1000 men	Density persons per Sq. mile	Land per capita (Acres)
1901	14992	63.38	31.66	31.72	1002	423	1.51
1911	14992	70.15	35.48	35.67	1005	468	1.37
1921	14992	78.13	38.91	39.22	1008	521	1.23
1931	14992	95.02	47.06	47.96	1019	634	1.01
1941	14992	110.37	54.53	55.84	1024	736	0.87
1951	14992	135.51	66.82	68.68	1028	904	0.71

Medical Institutions in Kerala as on 31-3-1957 (Districtwise)

Districts		Number of Institutions	Number of Beds
Trivandrum	..	53	2411
Quilon	..	32	509
Alleppey	..	38	1722
Kottayam	..	38	597
Ernakulam	..	50	1524
Trichur	..	48	1628
Palghat	..	42	501
Kozhicode	..	37	1452
Cannanore	..	27	537
Total	..	365	10881

Number of Veterinary Institutions in Kerala as on 31-3-1957.

District		Hospitals	Dispensaries	Inspector's Stations	Stockman's Stations
Trivandrum	..	5	3	..	..
Quilon	..	5	6	..	..
Alleppey	..	5	5	..	..
Kottayam	..	3	3	..	..
Ernakulam	..	9	11	..	..
Trichur	..	7	6	..	8
Palghat	..	4	5	8	..
Kozhicode	..	1	4	..	..
Cannanore	..	..	6	..	..
Total	..	39	49	8	8

HIGHER EDUCATION.

Number of Colleges and Institutions as on 31-3-1958.

	Districts	Arts and Science	Engineering	Medical	Law	Veterinary	Agriculture	Oriental	Polytechnic and other technical schools.	Training Colleges	Physical Education	Co-operation	Ayurveda	Research
1	Trivandrum	6	1	1	1	..	1	1	4	2	1	1	1	1
2	Quilon	5	1	..	..	..	..	..	1	..	..	..	..	..
3	Alleppey	4	..	..	..	..	..	..	2	2	..	..	..	..
4	Kottayam	6	..	..	..	..	..	1	..	4	..	..		..
5	Ernakulam	8	..	..	1	..	..	1	1	1	..	..	..	..
6	Trichur	5	..	..	..	1	..	1	3	1	..	..	..	..
7	Palghat	2	..	..	..	..	..	2	..	..	..	..	..	..
8	Kozhikode	6	..	1	..	..	..	3	1	1	1	..	..	..
9	Cannanore	2	..	..	..	..	..	1	1	1	..	..	..	..
	Total	44	2	2	2	1	1	10	13	12	2	1	1	1

DISTRICT-WISE DISTRIBUTION OF FACTORIES AND WORKERS IN KERALA—1957

District	*Trivandrum*		*Quilon*		*Alleppey*		*Kottayam*		*Ernakulam*		*Trichur*		*Palghat*		*Kozhikode*		*Cannanore*		*Total*	
Industry	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Oil Mills	...	..	6	125	24	613	3	49	5	112	23	347	3	17	6	133	7	67	77	1463
Tea	5	295	8	287	..	..	85	4273	..	..	3	322	1	36	10	374	11	356	123	5943
Cashew	3	1504	146	54773	3	1209	..	..	3	721	7	1962	..	..	2	1237	2	1168	166	62574
Bidi and Cigar	..	..	..	..	..	..	2	25	..	..	13	620	45	1463	13	334	25	671	98	3113
Cotton Textiles.	6	827	1	743	..	..	1	21	4	1168	7	5023	2	77	24	2086	157	8441	202	18386
Coir	..	..	3	393	92	9326	4	162	12	2581	..	..	..	..	13	1418	..	..	124	13880
Plywoods	..	..	1	114	..	..	4	220	..	..	2	370	2	40	..	..	5	725	14	1469
Splints and Veneers	4	234	10	570	1	43	4	148	..	..	6	396	17	1254	14	701	9	402	65	3748
Other wood industries	2	22	16	678	..	..	2	112	12	392	11	390	5	96	36	1521	17	804	101	4015
Printing	13	759	7	348	6	113	12	402	18	589	8	231	2	25	15	676	11	184	92	3327
Rubber (including Factories in Rubber plantations)	1	182	13	379	1	142	27	1032	..	..	9	205	..	..	9	275	1	6	61	2221
Chemicals	1	171	1	19	..	..	..	..	7	1890	..	..	..	..	..	..	..	..	9	2080
Matches	..	..	2	157	1	32	..	..	1	186	9	408	2	56	2	129	2	45	19	1013
Soap	..	..	..	..	..	..	..	..	3	1073	..	..	..	..	2	144	1	19	6	1236
Bricks and Tiles	..	..	26	1815	1	25	4	97	11	751	68	3168	12	1042	17	4193	8	883	147	11974
General and Electrical Engineering	2	65	2	304	2	23	2	133	7	308	7	206	2	69	5	467	3	40	32	1615
Automobile repairing	8	922	2	157	1	100	11	336	7	278	3	93	4	112	21	374	8	144	65	2516
Other industries	8	882	25	2795	13	787	6	519	35	4408	36	895	72	2177	41	2470	13	624	249	15557
Total	53	5863	269	63657	145	12413	167	7529	125	14457	212	14636	169	6464	230	16532	280	14579	1650	156130

(NOTE :— A—Number of Factories
B—Average daily employment in the factories)

WORKING CLASS COST OF LIVING INDEX NUMBERS

		1956	1957	Monthly Index Numbers for the year 1958.											
	Centres.	*Average*	*Average*	*January*	*February*	*March*	*April*	*May*	*June*	*July*	*August*	*September*	*October*	*November*	*December*
1	Trivandrum	389	402	409	406	399	397	399	396	409	409	412	418	420	423
2	Quilon	384	403	407	404	403	408	414	416	423	429	432	438	444	447
3	Punalur	387	422	432	427	425	421	417	420	424	427	429	433	438	443
4	Alleppey	381	404	412	409	404	404	406	404	408	410	414	419	424	432
5	Changanacherry	384	415	412	407	403	400	402	399	403	407	410	414	421	427
6	Kottayam	375	392	403	401	400	404	405	407	411	414	418	422	429	434
7	Alwaye	378	401	400	398	395	398	401	403	409	414	420	428	436	446
8	Ernakulam	391	408	413	409	405	407	410	412	420	424	429	436	441	447
9	Trichur	374	400	411	410	407	411	414	418	423	430	438	445	452	457
10	Chalakudy	388	410	421	420	419	420	423	422	425	427	434	441	447	455
11	Munnar	381	379	381	381	381	382	387	392	399	404	411	416	422	429
12	Kozhikode	424	433	429	423	417	418	421	426	432	435	442	451	460	468

NOTE :—Base for Centres other than Kozhikode August 1939=100 For Kozhikode Base is average Price from July 35 to June= 1936-100.

STATE FINANCE-SUMMARY POSITION

I. Revenue Account

		1957-58 (Revised Estimate) (Rs. in lakhs)	1958-59 (Budget Proposals) (Rs. in lakhs)
Revenue :			
(A) Tax Revenue	..	1962.404	2176.447
(B) Non-Tax Revenue	..	1005.477	1185.989
Total	..	2967.881	3362.436
Expenditure :	..	2987.572	3417.267

II. Capital Account

Receipts :			
Total	..	9740.041	9043.465
Opening Cash balance	..	102.232	35.534
Grand Total :	..	9842.273	9078.999
Expenditure :			
Total	..	9806.739	9079.520
Closing Cash balance	..	35.534	—0.521
Grand Total :	..	9842.273	9078.999

Statement showing the outlay by Major Heads of Development under the First and Second Five Year Plans

(1951-56 and 1956-61)

	Head of Development	*Actual outlay under the First Five Year plan* (Rs. in lakhs)	*Percentage to total*	*Plan outlay under the Second Five Year Plan* (Rs. in lakhs)	*Percentage to total*
1.	Agriculture and Community Development	232.29	6.9	1582.12	18.18
2.	Irrigation and Power	2228.49	66.1	3208.96	36.88
3.	Industry and Mining	64.97	1.9	683.98	7.86
4.	Transport and Communications	400.82	11.9	557.28	6.41
5.	Social Services	445.73	13.2	2381.18	27.37
6.	Miscellaneous	..	..	287.19	3.30
	Total	3372.30	100.00	8700.71	100.00

LAND UTILISATION—KERALA STATE

(1956-57)

Details of Utilisation	*Area in 1,000 acres*	*Percentage of total area according to village papers*
According to Professional Survey	9595	
According to Village Papers	9412	
Forests	2459	26.2
Barren and Uncultivable Land	497	5.3
Land put to non-agricultural uses	503	5.3
Cultivable waste lands	437	4.6
Permanent Pastures and grazing lands	121	1.3
Land under miscellaneous tree crops	508	5.4
Current fallows	155	1.6
Other fallows	207	2.2
Net area sown	4525	48.1
Area sown more than once	940	
Total cropped area	5465	

AREA UNDER AND PRODUCTION OF PRINCIPAL CROPS

(1955-56)

Name of Crop	*Area (1000 acres)*	*Production in 1000 tons*
Paddy	1954	1358
Pulses	111	17
Tapioca	558	1569
Bananas	116	311
Sugarcane	18	327
Pepper	214	27
Ginger	26	13
Cardamom	69	1
Arecanut	144	648*
Cashewnut	93	56
Cocoanut	1107	310*
Groundnut	33	14
Rubber	203	21
Coffee	37	6
Tea	99	30

* In crores of Nuts.

SOWING, HARVESTING & PEAK MARKETING SEASONS OF PRINCIPAL CROPS IN THE KERALA STATE

	Crop		Sowing	Harvesting	Peak Marketing
1	Rice	Autumn	April —June	Aug. —Oct.	Sept. —Oct.
		Winter	Aug. —Oct.	Dec. —Feb.	Jan. —Feb.
		Summer	Nov. —Dec.	Feb. —March	March —April
			Jan. —March	April —May	May —June
2	Ragi	1st crop	April —July	Aug. —Oct.	Sept. —Oct.
		2nd crop	Sept. —Oct.	Dec. —Jan.	Dec. —Jan.
3	Small millets (Samai)	Kharif	May	August	August
		Rabi	September	December	December
4	Red gram	1st crop	May. —June	Aug. —Sept.	Sept. —Oct.
		2nd crop	Aug. —Oct.	Nov. Jan.	January
		3rd crop	February	April	April
5	Horse gram	1st crop	Aug. —Oct.	Nov. —Jan.	Jan. —Feb.
		2nd crop	Feb. —March	April —May	May —June
6	Greengram		May —June	Aug. —Sept.	Sept. —Oct.
7	Black gram	1st crop	May —June	Aug. —Oct.	October
		2nd crop	Oct. —Nov.	Jan. —Feb.	February
8	Other Pulses		May —June	Aug. —Sept.	Aug. —Sept.
			October	Dec. —Jan.	January
9	Sugarcane	1st crop	Nov. —Feb.	Oct. —Dec.	Nov. —Dec.
		2nd crop	Jan. —March	Dec. —Feb.	February
10	Ginger (raw)		April —May	Nov. —Jan.	Dec. —Jan.
11	Pepper		..	Nov. —Jan.	Dec. —Feb.
12	Sesamum	1st crop	Feb. —March	June —July	July —Aug.
		2nd crop	Aug. —Oct.	Dec. —Jan.	Dec. —Jan.
		3rd crop	Dec. —Jan.	March —April	April —May
13	Cotton		Aug. —Sept.	Feb. —March	Feb. —March
14	Sweet potatoes	1st crop	June —July	Sept. —Oct.	Sept. —Oct.
		2nd crop	Sept. —Oct.	Dec. —Jan.	Dec. —Jan.
		3rd crop	Nov. —Dec.	Feb. —March	Feb. —March
15	Turmeric		April —May	Dec. —Jan.	Jan. —Feb.
16	Lemongrass			June —Sept.	September
17	Tapioca	1st crop	Oct. —Nov.	Aug. —Sept.	Aug. —Sept.
		2nd crop	March —May	Nov. —Jan.	Dec. —Jan.
		3rd crop	July —Sept.	May —July	June —July

Government Press, Trivandrum, 1959.


Sira
Huliyār
Gauribidanūr
Chik Ballāpur
Chintāmani
Madanapalle
Pileru
Bhākarapeta
Renigunta
Tada
PULICAT
Puttūr
Ayirāla
Pūtalapattu
CHITTOOR
Palmaner
KOLĀR
Arsikere
TUMKŪR
Kunigal
HASSAN
BANGALORE
Bangārapet
Kolār Gold Fields
VELLORE (NORTH ARCOT)
Arcot
Conjeeveram
Arkonam
Rānipet
Cholinghūr
Channarāyapatna
Hole Narsipur
Rāmanagaram
Anekal
Hosūr
Kuppam
Āmbūr
Arni
PALAR
Chingleput
Maddūr
KRISHNARĀJĀSAGARA RESERVOIR
MANDYA
Kanakapura
Krishnagiri
Polūr
Wandiwāsh
Fraserpet
Seringapatam
Hunsūr
MYSORE
Sivasamudram
Tiruppattūr
Avalūr
Tiruvannāmalai
Tindivanam
Hanjangūd
Kollegāl
Ajjipuram
Kowdalli
Dharmapuri
Harūr
PONNAIYĀR
Villupuram
Madras
Gundlupet
Chāmrājnagar
STANLEY RESERVOIR
Tirukkoyilūr
PONDICHERRY
Manantoddy
Mettur
Omalūr
Yercaud
Alagāpuram
Kallakkurichchi
Kiranūr
CUDDALORE (SOUTH ARCOT)
Ātūr
SALEM
Satyamangalam
Kodanād
Vriddhachalam
Porto Novo
Chidambaram
Gūdalur
OOTACAMUND (NĪLGIRI)
Nilambur
Coonoor
Bhavāni
Sankaridrug
Rāsipur
Erode
Nāmakkal
Mannārgudi
Tirumullaivāsal
Avanāshi
Perundurai
Perambalūr
Turaiyūr
Manjeri
Avalanche
COIMBATORE
Tiruppūr
Kodumbai
Kilpaluvūr
Māyavaram
Tranquebar
Kangayam
Palladam
Karūr
Kumbakonam
KĀRIKĀL (PONDICHERRY)
Alandurai
Shoranūr
Pālghāt
TIRUCHCHIRĀPPALLI
Negapatam
Dhārāpuram
TANJORE
Pollachi
Mannārgudi
Kuddegode
Idaiyakottai
Tirutturaippundi
Udamalpet
Pādagiri
Mt. Stuart
Palni
SOUTHERN RAILWAY
Pudukkottai
Pattukkottai
Muttupet
Agastiyampalli
Point Calimere
Valpārai
Kodaikānal
Dindigul
Angamāli
Anai Mudi 8841
Kodaikānal Road
Tiruppattūr
Parur
Munnar
Devikolam
Periyakulam
Arantangi
Kattumāvadi
PALK STRAIT
Ernākulam
Bodinayakkanūr
Devokottai
Cochin (Madras)
Todupulai
Uttamapālaiyam
Usilampatti
MADURA
Mimisal
Kankesanturai
Tirumangalam
Sivaganga
Gūdalūr
Saptūr
Tondi
JAFFNA
Ettumānūr
Pirmed
Thekkadi
Mānāmadurai
KOTTAYAM
Srīvilliputtūr
Virudunagar
Alleppey
PERIYAR LAKE
Aruppukkottai
Paramagudi
Devipattanam
RAMNĀD
Chengannūr
Sivagiri
Mudukulattūr
Rāmeswaram
Māvelikara
Rudūr
Sāyalkudi
Kilakkarai
Kovilpatti
Vilāttikulam
Dhanushkodi
Adūr
Taloimanaar
Kottārakara
Tenkāsi
Manaar
Chavara
QUILON
Tenmalai
GULF OF MANAAR
Tuticorin
Paravūr
Tinnevelly
PALAMCOTTAH (TINNEVELLY)
Medumangād
Srivaikuntam
Tiruchchendūr
TRIVANDRUM
Nānguneri
Tisaiyanvilai
South India
Kalpitiya
Kolachel Port
Vijayāpati
NĀGERCOIL (KANNIYĀKUMARI)
Cape Comorin
Puttalam
CEYLON
Continuation
76°
78°
8°
F
G

February 16

We are up early and take the road north through Ernakulam and Angamali to Trichur, a district headquarters. At first we go through large areas of coconut plantings, some on rather wettish soil and some on low sandy areas that seem dry now. We go through several low hills suggesting Red Latosol-Ground-Water Laterite intergrade. In places the partially hardened laterite is taken out for building stones. (K-2697) In fact many of the houses and walls are made of laterite.

Laterite bricks are taken out in a weakly consolidated condition. After exposure to wetting and drying these soon become very hard. Two sizes are being taken: (1) 18" x 9" x 6" at Rs 10.00 for 100 bricks, and (2) 12" x 9" x 6" at Rs 7.50 for 100 bricks. The average cost for cutting is about RS 4.00 per 100 and the land owner gets Rs 1 per 100.

The uplands carry mixed cultures of coconut palm, arecanut palm, mangoes, jack fruit, bananas, and other fruits. There are also some pure stands of bananas and some tapioca in the poorest upland parts. In places there are many pepper vines. But all the lowland areas and even some of the gentle slopes are used for paddy. Most of these are dry now; but where there is water for irrigation paddy is grown now. Some is just being planted and some is nearly a foot high.

Ap. XII, XIII

February 16

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Ap. XII, XIII

K-2697. February 16, 1959. Near Alwaye.
Old laterite cuttings.

K-2698. February 16, 1959. Near Alwaye.
Fishermen in road ditch.

K-2697. February 16, 1959. Near Alwaye.
Old laterite cuttings.

K-2698. February 16, 1959. Near Alwaye.
Fishermen in road ditch.

Near Alwaye, February 16, 1959: M. S. Nair and C.E.K. at laterite cuttings in Kalmeswari Village. (Photo by Dr. Raychaudhuri.)

Near Trichur, February 16, 1959: P. D. Nair, C.E.K., Mukumdam, M. S. Nair, and O. J. Kelly at laterite quarry. (Photo by Dr. R.)

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DR.M.S.NAIR & DR.J.T.KELLOGG AT THE
LATERITE QUARRY IN KALMESWARI
VILLAGE NEAR ALWAYE TOWN, DISTT.
ERNAKULAM, KERALA STATE (16.2.59)

Near Alwaye, February 16, 1959: M. S. Nair and C.E.K. at laterite cuttings in Kalmeswari Village. (Photo by Dr. Raychaudhuri.)

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DR. J.T.KELLOGG, MR. MOHINDAR, DR.M.S.
NAIR & DR.D.P.TRENT AT LATERITE
QUARRY, VILLANKULAM, DT. TRICHUR,
KERALA STATE (16.2.59)

Near Trichur, February 16, 1959: P. D. Nair, C.E.K., Nukumdam, M. S. Nair, and O. J. Kelly at laterite quarry. (Photo by Dr. R.)

Near Alwaye I photograph the paddy fields. (K-2698; K-2699; K-2700). It is said that they usually broadcast the seed in February for a crop of 800 to 1,200 pounds taken in June. (If enough water is available for good irrigation a transplanted crop is sown that yields about 1,500 pounds.) The second crop is all transplanted for the monsoon season and yields some 1,600 to 1,800 pounds per acre. Commonly a third crop, such as sesame, follows the monsoon rice crop. (K-2701)

Further on, I see some feeble bunds on very steeply sloping red soils from granite. (K-2702) On some slopes, tapioca is planted in rows up and down the slope. The soils are thin in places and erosion is going on. These steep soils do not have laterite. Here masonry terraces seem essential to me if cultivation is to continue.

We have tea at the rest house in Trichur, made over from a house of a former Maharajah and go on northwest to Peechi Dam. Along this road very steep slopes are used for tapioca with inadequate low terraces in places; elsewhere the rows are straight down the slopes. Some of the slopes are in teak forest on government land. I am told here that there is a scheme for reforestation - called the "tangya" system - through which the cultivators can use the land for crops for 3 to 5 years provided they put out and take care of the young teak seedlings planted the first year. Between the high hills and the bottoms with paddy is gently sloping reddish-brown soil used

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K-2699. February 16, 1959. Near Alwaye.
Plowing low paddy land.

K-2700. February 16, 1959. Two miles north of
Angamali. Irrigated paddy.

K-2699. February 16, 1959. Near Always.
Flowing low paddy land.

K-2700. February 16, 1959. Two miles north of
Angamali. Irrigated paddy.

K-2701. February 16, 1959. Near Trichur.
Road scene.

K-2702. February 16, 1959. South of Trichur.
Looking across dry bunded paddy fields
with strongly sloping terraced Red
Latosol in background.

K-2702. February 16, 1959. South of Trichur.
Looking across dry bunded paddy fields
with strongly sloping terraced Red
Latosol in background.

K-2703. February 16, 1959. Near Trichur.
Road scene.

for mixed cultures of palms, fruit trees, pepper vines, and bananas. We stop a moment in a 5-year old rubber planting on the Vellanikara Rubber Estate. (K-2703; K-2704) We also stop to look at some recent terracing managed by Joint Director of Agriculture for Soil Conservation, Dr. M. S. Nair. The work was fairly good but some of the terraces were broken and there is now erosion. (K-2705; K-2706) Some staff is needed to insist upon maintenance. Then too, these soils are not good for bunding. During the dry season they tend to overgranulate and become"sugary." If care is taken to use soil from the B horison, they are firmer; but in some places stone terraces are the only satisfactory answer that I know. (K-2708)

It is said that terracing is carried out under the Travancore-Cochin Land Development Act of 1950 according to which farmers pay 75 percent of the cost in 15 installments. We are told that earth bunds cost from Rs 60 to 70 per acre. Certainly inspectors are needed to see that the bunds are maintained.

We go on to Peechi Dam and talk for awhile. This dam is primarily for irrigation water and secondarily for drinking water for Trichur. Some power could be developed also. The area above and below is beautifully and expensively landscaped. On the way back I stop where laterite bricks are being removed. (K-2707; K-2964)

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K-2703. February 16, 1959. South of Trichur.
Tapped rubber tree.

K-2704. February 16, 1959. South of Trichur.
Young rubber planting.

K-2703. February 16, 1959. South of Trichur.
Tapped rubber tree.

K-2704. February 16, 1959. South of Trichur.
Young rubber planting.

K-2705. February 16, 1959. East of Trichur. New terraces on Red Latosol; paddy in foreground.

K-2706. February 16, 1959. East of Trichur. New terraces on Red Latosol, poorly maintained. (Dr. Nair).

K-2705. February 16, 1959. East of Trichur.
New terraces on Red Latosol; paddy in
foreground.

K-2706. February 16, 1959. East of Trichur.
New terraces on Red Latosol, poorly
maintained. (Dr. Nair).

Near Trichur, February 16, 1959: C.E.K., O. J. Kelly and --, in bunded area. (Photo by Dr. R.)

At Peechi Dam, February 16, 1959: L.J.K. (Photo by Dr. R.)

6

K-2707. February 16, 1959. East of Trichur.
Cutting laterite bricks.

K-2708. February 16, 1959. East of Trichur.
Mainly tapioca on steeply sloping
Red Latosol from granite.

K-2707. February 16, 1959. East of Trichur.
Cutting laterite bricks.

K-2708. February 16, 1959. East of Trichur.
Mainly tapioca on steeply sloping
Red latosol from granite.

K-2964. February 16, 1959. Kalmeswari Village.
Laterite cuttings.

K-2964. February 16, 1959. Kalmeswari Village.
Laterite cuttings.

We return to the rest house for a slow lunch. We leave about 3:00 and Dr. Nair insists that we take a short side trip to the east from the main road about 8 miles south of Trichur. Much of this is on the gently rolling reddish-brown soil. Of course, the low places are used for paddy. The uplands have a luxurious mixed culture of palms, fruit trees, pepper vines, and bananas with a few patches of tapioca and small banana fields.

We pass into the beautiful Cochin-Malabar Rubber Estate of the Indo-Malayan Company said to be about 50 years old. The trees make a nearly complete canopy. There is no ground cover or only very little. It is said that a thick ground cover of kudzu vine would be helpful but would harbor dangerous snakes. A part of this plantation is on the gently rolling soil from colluvium and a part reaches up to the lower slopes of the stony, strongly rolling red soils from granite. The soil on these hills is a dark reddish-brown (5YR 3/4) loam to sandy clay loam of greatly varying thickness. The rock is said to be granite; but if so it is unusually rich in felspars and ferro-magnesium minerals. It is a kind of intergrade between lithosolic Red Latosol and lithosolic Reddish-Brown Latosol.

At the edge of the rubber planting we get into a jeep and go about 2 miles over a terrible stony road to see some new masonry terracing approximately on the contour. These terraces are about 4 feet high. The walls slope somewhat upgrade and are made of well-fitted stones (without mortar) taken by blasting from rock outcrop; although some of them appear to be laterite taken from the lower slopes. (There is no laterite in these bold hills.)

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Near Trichur and Cochin Malabar Rubber Estate, February 16, 1959: C.E.K. and M. S. Nair with villagers. (Photo by Dr. R.)

DR.C.E.AYILOOR WITH DR. M.S. NAIR AND
LOCAL VILLAGERS AT PALANIKARA VILLAGE,
PALLATTUR WYNAD RANGE, COCHIN MALABAR
RUBBER ESTATE, MT. TRICHUR, KERALA
STATE (16.V.54)

Near Trichur and Cochin Malabar Rubber Estate, February 16, 1959:
C.E.K. and M. S. Nair with villagers. (Photo by Dr. R.)

The work looks quite good. The terraces seem to be from 50 to 150 feet apart, depending on the slope. They try to place one at each 10-foot contour interval. The soil will be used mainly for tapioca and some for bananas. Four hundred acres have been finished and 200 more will be treated here. Cultivators pay 75 percent of the cost, which averages Rs 200 per acre, not counting the time of technicians for which they do not pay. I am told that about 400 acres have been terraced in this way here and 4,000 acres in the State. I take several photographs and we start back. (K-2710; K-2711; K-2965) I am glad to have seen this work but both time and distance were far greater than Dr. Nair told me.

On the way back I take a little time to photograph a well for lift irrigation and some women transplanting paddy. (K-2963; K-2712; K-2713)

A little way beyond the horn goes wrong and we stop 15 minutes for repairs. About the last 30 miles into Cochin we ride in the dark. We stop for a long wait at a railway crossing. I get out and stretch. Just as we are over the track I miss my notebook. But I reach into my carrying case and feel it. So all is well. We are back to the hotel about 8:00.

When I go to make a record in my notebook I discover that the one I felt in the dark was an extra one. The notebook I've been using for nearly two weeks is lost! What a pity! Had we not been so late this would not have happened. For many, many years I've

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K-2710. February 16, 1959. Southeast of Trichur. Fitted stone-wall terraces on Red Latosol from granite.

K-2711. February 16, 1959. Southeast of Trichur. Another view of fitted stone-wall terraces on Red Latosol from granite.

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Fitted stone-wall terraces on Red Latosol
from granite.

K-2711. February 16, 1959. Southeast of Tridum.
Another view of fitted stone-wall terraces
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K-2965. February 16, 1959. Southeast of Trichur, near Malabar Rubber Estate. Fitted stone-wall terraces on Red Latosol from granite.

K-2965. February 16, 1959. Southeast of Trichur, near Malabar Rubber Estate. Fitted stone-wall terrace on Red Latosol from granite.

K-2963. February 16, 1959. Two miles north of Angamali.
Lift irrigation for paddy.

K-2963. February 16, 1959. Two miles north of Angwalli.
Lift irrigation for paddy.

K-2712. February 16, 1959. South of Trichur.
Lift irrigation for paddy.

K-2713. February 16, 1959. South of Trichur.
Transplanting paddy.

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Today they told me that in areas of irrigation they get three crops of paddy. Sometimes the first and last are sown directly and the second transplanted. Sometimes the third crop is sesame rather than paddy. The second crop may run as high as 2,200 to 2,400 pounds. But a good deal of the paddy land has only the single monsoon crop. I was told that tapioca averages about 1½ tons for the State; many get 4 or 5 tons; and a few have over 10 tons. Some nitrogen is used, especially on coconuts and rice. This is mostly ammonium sulphate but they have a little urea. For phosphorus they favor a hyperphosphate from North Africa which is ground very finely to pass a 300 mesh screen. Much of the paddy gets green manure and animal manure and around a quarter of it wood ashes. Wood ashes are used on the coconuts but they would benefit from more potash. On the whole I gather that only a very small percentage of the fertilizer is used that should be. They are also using quite a bit of bone meal at a high price. They insist that this is much better than superphosphate, which I am inclined to doubt a bit.

(Added later: Except for close views of the steeper red hills, the mixed cultures on the well-drained, undulating to gently sloping red soils with laterite are like those to be described south of Alwaye.)

Mommy and I work late to get my memory recorded while it is still reasonably fresh. But I am not fresh!

And so to bed, very tired.

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February 17

We are up about 6:15 and ready to go at 7:15. The car comes with Dr. M. S. Nair, and Dr. Raychaudhuri. Mommy and I, and Mr. P. D. Nair get in and we leave about 7:35. We drive north of town along the way we came yesterday. There are many people in and along the road. Just outside the city there are a great many houses with small gardens of mixed culture but mainly coconut palms, although they have mangoes and other fruit. Part of the way the soil is on a low very sandy delta. It is 3 or 4 feet to the water table and the surface soil is quite dry.

Shortly after leaving the coastal strip we are on the undulating red soil with laterite beneath. We stop at the railway crossing where I lost my notebook and a man in the little store says it was picked up in the early morning by a workman in a nearby mill, which is opposite the place where I first photographed the laterite yesterday - Kalamassessery. We talk with the manager and he agrees to put out a notice and offer Rs 10 reward. Most of the party think I have a 50-50 chance to get it back. (Added later: I did not.)

We go on north to Alwaye and then take the road generally east and south. Here the palms are less and there are more bananas. I recall now that the first pictures I took were 3 miles south of Alwaye.

We meet people hauling large laterite bricks on little hand carts. There is a luscious mixture of coconut and arecanut palm (also called betelnut palm), bananas, mangoes, cashewnuts, pepper vines, and a few

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small paddy areas. I guess that the soil is derived from a sandy and silty cover over the Ground-Water Laterite. The depth to the slightly hardened laterite is uneven. The surface is undulating to gently rolling. As we go on I see these lush mixed cultures with a large paddy area to the south; and a little way further on we turn south and the paddy is to the east of us. One must understand that usually paddy is the first choice, but in the low sandy areas paddy is second choice after coconuts.

We pass Vazhakulam, one of the many villages. In fact, along these main roads one village just merges into another. Here there is wettish paddy, tapioca, fruits, and bananas both separately and in mixtures. We pass both power and hand sawyer yards. Many house walls here are laterite; some have tile roofs and some are thatched witl palm. Generally the road is on the gently rolling soil over the Ground-Water Laterite. We cross a large bottom nearly one-half of which has green paddy from lift irrigation.

We pass Perumbavoorr. There is a lemon-grass experimental station nearby. When uncut this is a bunchy grass about 4 or 5 feet high. It is grown mainly as the last resort on the thin hilly soils. It is cut 2 or 3 times during the year. The oil from it is used in perfumes and for ascorbic acid. Here and there along the road the upper soil has been removed exposing the laterite. We pass a planting of bitter gourd, which climbs on stakes. It has a long fruit. We cross a paddy area, a stony hill, and then continue with the same pattern of mixed cultures on the uplands and paddy in the lowlands, nearly all dry. (K-2714)

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K-2714. February 17, 1959. North of Kottaym, Kerala. Terraces for paddy with a small pulse cover crop.

K-2714. February 17, 1959. North of Kottayam, Kerala.
Terraces for paddy with a small pulse cover crop.

Between Kottayam and Ernakulam, February 17, 1959:
M. S. Nair and C.E.K. examine mixed cultures and
old soil with laterite. (Photo by Dr. R.)

Between Kottayam and Ernakulam, February 17, 1959:
M. S. Nair and O.E.K. examine mixed cultures and
old soil with laterite. (Photo by Dr. R.)

We pass several loads of earthen pots. I see fields of sesame following paddy in the rotation. As we drive on, there are bold hills to the east of us but the road is on the undulating to gently rolling soil with laterite, from colluvium. I see the same mixed cultures along with palmyra palm and bamboo and some small fields of tapioca and bananas.

We pass Muvattupuzha, a large market town and block headquarters. the road is now winding on rolling soil with both old and new masonry terraces from granitic stones and laterite blocks fitted together without mortar. There is still a lush mixed culture where the soil is deep.

I photograph terraces, partly for monsoon paddy and partly for other crops near the village of Ahoor. Next we have nearly steep stony hills from the granite, colluvial slopes with laterite, and narrow valleys bunded for paddy. Some of these hills can be used only for forest. The government offered cultivators the use of these steep stony soils but there have been few takers. As we go on I see beautiful terraces and well-cared-for soil under mixed cultures, including pepper vines and coffee, along with coconut, palmyra, and arecanut palms. In the narrow valleys I see beautifully made bunds with flat paddy fields at different levels. These are good farmers. Most of the land is said to be in private holdings of one-half acre to 3 acres. Holdings of 20 to 50 acres are rare, and holdings less than one-half acre are common.

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But beyond, some of the hilly areas are badly handled with tiny ridges instead of masonry terraces, and considerable erosion. The surface soil is too "sugary" and sandy for good bunds. I am told this situation is more characteristic of the land further to the east. We pass Kuthttukulam. Some hills along this winding road have large patches of black granite outcrop.

Now it is hot. Both men and women of the upper classes walk under black umbrellas to protect them against the sun. We pass Kozha. I see ginger being dried. Still on the main central road, we pass Kuravilangad, a market town with a Catholic church and school. We continue on the same gently rolling reddish soil with deep laterite under mixed culture and enter Kottaym, a large market town of 200,000. Here much of the rubber is marketed as well as coffee and other crops.

We arrive at the boat landing on a big canal about 11:00 and get into a boat to go west to look at the Kuttand area, which is mostly 4 feet below sea level. There are 337 square miles of this wet land, which is flooded for about 4 months by the many rivers that flow in it. When the floods of fresh water are over the salt water comes in from the sea. Considerable land has been reclaimed from this backwater of the Arabian Sea called Vembanad Kayac.

We are escorted by several additional people including Mr. M. Janardhanan Nair, Joint Director of Agriculture (Extension); Mr. K. Raman Menon, Deputy Director of Agriculture; and Mr. P. M. Joseph, District Agricultural Officer.

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We are escorted by several additional people including Mr. M. Janardhanan Nair, Joint Director of Agriculture (Extension); Mr. K. Raman Menon, Deputy Director of Agriculture; and Mr. P. M. Joseph, District Agricultural Officer.

The boat takes us west in the canal, which is about 4 or 5 feet higher than the adjacent land. Houses, some of them quite nice, little stores, and other buildings are located on the rather broad levee bank for the first two miles (K-2715, etc.) I am told that all of these are flooded for a short time in June but that everybody knows how to handle a canoe and can get out in time. Where rather wide terraces have been built up, I see coconut palms, bananas, tapioca and other crops, with the large paddy areas in the background. I am told that the pH of the paddy soils here is about 5.5 but that nearer the sea are organic-rich cat clays that become very acid upon drainage. Even here the lower soils are said to become acid when dry.

We come out into a wetter area. I notice paddy being harvested on one side (K-2717) with land lying fallow under water on the other. I am told that yields run 1,000 to 1,500 pounds of paddy. Here the lower soils are said to become acid when dry.

Even this wet difficult soil, reached only by boat, is said to sell for Rs 1,000 per acre.

Along the canal we see many fair-sized cargo boats, or wallums (K-2722), and ordinary canoes and very tiny ones. Some people also raise ducks. (K-2725)

About 4 miles out we stop at a pumping station where the water is pumped by electric motors from the drainage canals into the high canal. Here the water level is about 6 feet above the land. The canal levees are made with earth held in place by vertical bamboo posts reinforced with sticks. These are about 15 to 25 feet wide at the

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K-2715. February 17, 1959. Kuttand area, Kerala.
Characteristic home and mixed culture.

K-2722. February 17, 1959. Kuttand area, Kerala.
Home and wallum along canal.

K-2715. February 17, 1959. Kuttand area, Kerala.
Characteristic home and mixed culture.

K-2722. February 17, 1959. Kuttand area, Kerala.
Home and walkway along canal.

K-2716. February 17, 1959. Kuttand area, Kerala. Paddy along the canal with coconuts in background.

K-2717. February 17, 1959. Kuttand area, Kerala. Harvesting paddy.

K-2716. February 17, 1959. Kuttand area, Kerala.
Paddy along the canal with coconuts in background.

K-2717. February 17, 1959. Kuttand area, Kerala.
Harvesting paddy.

K-2718. February 17, 1959. Kuttand area, Kerala
Homes along canal.

K-2719. February 17, 1959. Kuttand area, Kerala.
Threshing floor with unthreshed paddy.

K-2718. February 17, 1959. Kuttanad area, Kerala.
Homes along canal.

K-2719. February 17, 1959. Kuttanad area, Kerala.
Threshing floor with unthreshed paddy.

K-2720. February 17, 1959. Kuttand area, Kerala.
Home and mixed culture along canal.

K-2721. February 17, 1959. Kuttand area, Kerala.
View along canal.

K-2720. February 17, 1959. Kuttand area, Kerala.
Home and mixed culture along canal.

K-2721. February 17, 1959. Kuttand area, Kerala.
View along canal.

bottom, 8 to 10 feet high and 6 to 10 feet wide at the top. In many places the faces are reinforced with stone and concrete walls. The owners hope to get the government to give them loans for 15 years for rebuilding some of them. These levees and the field bunds need to be strengthened each year.

Where possible, high bunds are made out in the wet land to enclose areas of one-tenth acre to perhaps a half acre and the insides built up with silt and sand removed from the canals. Thus one sees many man-made terraces some 3 to 5 feet above the paddy land used for coconuts. Coconuts are more valuable per acre than this one-crop paddy land; but not so valuable as 2- or 3-crop paddy land.

After the floods, the water is pumped out of the paddy fields. When it is only one to two feet deep sprouted paddy seeds are sown broadcast at the rate of 100 to 150 pounds per acre. Then the remainder of the water is pumped out within four days. The fields are dry for 6 to 7 days. The first water given is to a depth of 2 inches. Gradually the water is added and withdrawn so that it varies somewhere between 2 inches and 12 inches deep at the time of flowering. The depth varies because as sea water comes back more fresh water is added to dilute it. At the moment we are here, paddy is being harvested and the water has been pumped out to have the very surface dry. Most varieties used here require 85 to 90 days for the crop, but some take 110 days.

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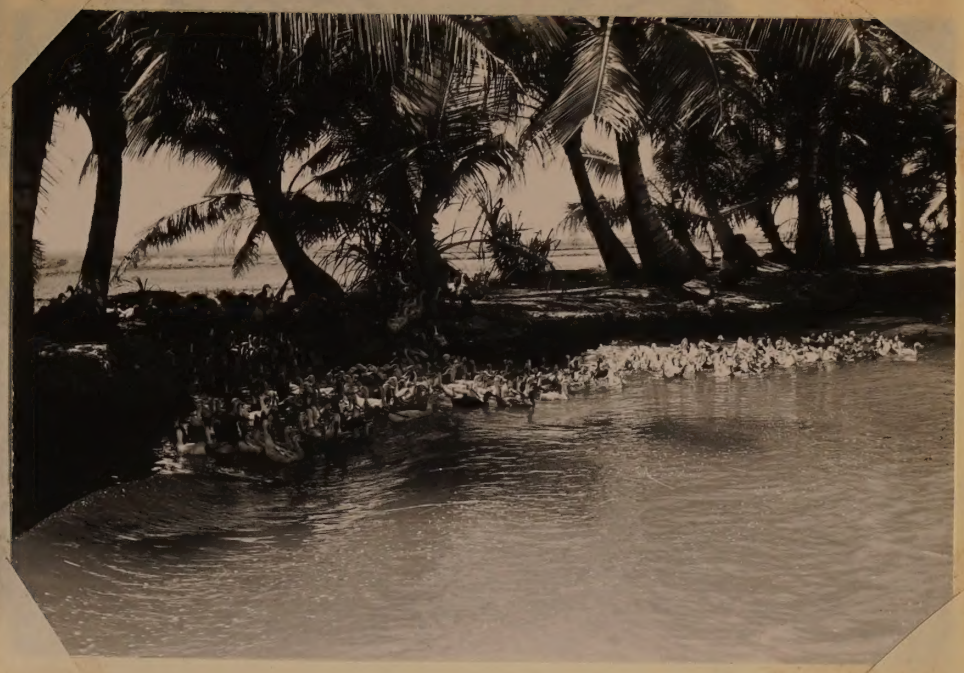
K-2723. February 17, 1959. Kuttand area, Kerala. Along the canal with threshing in the background.

K-2724. February 17, 1959. Kuttand area, Kerala. Home along canal.

K-2723. February 17, 1959. Kuttanad area, Kerala.
Along the canal with threshing in the background.

K-2724. February 17, 1959. Kuttanad area, Kerala.
Home along canal.



K-2725. February 17, 1959. Kuttand area, Kerala.
Ducks along canal.

K-2726. February 17, 1959. Kuttand area, Kerala.
Harvesting rice along the canal.

K-2125. February 17, 1959. Kuttand area, Kerala.
Ducks along canal.

K-2126. February 17, 1959. Kuttand area, Kerala.
Harvesting rice along the canal.

On Canal near Kottayam, February 17, 1959: C.E.K., and L.J.K. (Photo by Dr. R.)

Near Kottayam, February 17, 1959: Paddy below sea level. C.E.K. right. (Photo by Dr. R.)

DR. A REDDY C.E.K.KALLOOR SEATED IN DIESEL ENGINE MOTOR-BOAT IN CANAL JOINING KOTTAYAM WITH VEMBANAD KAYAL (LAKE), KERALA STATE (17.2.59).

On Canal near Kottayam, February 17, 1959: C.E.K., and L.J.K. (Photo by Dr. R.)

DR.C.E.KALLOOR,SHRI P.P.JOSEPH AND SHRI V.GOPALASWAMY AT A.C.PAULOSE'S KURIYANOOTTIL PADIYAM BEACHES, 4 TO 5 MILES AWAY FROM KOTTAYAM. AGRICULTURAL LAND - 4 TO 6 FT. BELOW WATER LEVEL. KUTTANAD AREA, KERALA STATE (17.2.59).

Near Kottayam, February 17, 1959: Paddy below sea level. C.E.K. right. (Photo by Dr. R.)

The usual practice is to use 20 pounds of nitrogen, 40 pounds of P_2O_5, and 20 pounds of K_2O per acre. Only a little manure is available but such manure and ashes as can be had are used. Bone meal is much more popular than superphosphate on the acid soils.

Where I look at the paddy being harvested the yield is about 1,500 pounds of husked rice. The soil could be called a very dark brown to black Humic Gley. The texture is a silty clay loam. Here the organic matter is said to be 4 percent and the pH 5.5. The lower ditch bank suggests that the soil is more acid beneath and I'm told that soluble aluminum is abundant along with sulphates.

A land owner of 60 acres meets us at the pumping station. He lives on the canal 2 miles from his land. He has 3 permanent workers who are paid in cash and in kind since the owner takes care of their immediate families. These workers are to keep a close watch of the levees. This year there were 2 small breaks.

He says that many large land owners live as far as 100 miles away.

He tells us that land owners are having trouble because of the unionization of the itinerant laborers (no doubt with Communist leaders) and some land holders have been forced to (or have chosen to) leave their land idle. The itinerants get daily wages of Rs 1.9 for men and Rs 1.2 for women. (About 40¢ and 25¢, U. S.)

We turn around and go back. I try for several pictures but I am afraid that not many will turn out. We meet and pass all sorts of little boats, some loaded with laterite bricks, some with paddy, some with ashes, etc. (K-2727) Curiously, not far from the canal there is a cement factory using shells from this old lake. Certainly

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K-2727. February 17, 1959. Kuttand area, Kerala.
Boat with laterite bricks on the canal.

K-2727. February 17, 1959. Kuttanad area, Kerala.
Boat with laterite bricks on the canal.

this is an amazing place. Obviously many families make their homes in the wallum boats.

During the boat trip we ate snatches of lunch and at 1:00 p.m. we are back in the cars to continue our journey southward. We pass a large area of green paddy, some of which is nearly ready for harvest. This area gives two crops. In a little way the road is on the low upland with the same mixed cultures I had seen this morning. Many of the slopes are terraced and the drier ones are used for tapioca.

The population is dense here and we pass many schools and colleges, some of them Catholic.

We pass Changanassery, a fair-sized market town. Nearly every town and village has electricity. We see young sugarcane on land that would otherwise be used for paddy. (K-2728)

We pass Thirnualla, a small market town, and cross the Manimala River. Here I see sugarcane, tapioca, coconut palms, and paddy.

We cross some more villages and cross the Pampa River.

Where we are driving coconuts are preferred to one-crop paddy on these gray, wettish, sandy soils. The cultivator starts by making mounds around 2½ to 3 feet high in which he plants the young palms in a geometric pattern. As time is available he fills in between the mounds to get benches, and then between the benches to get a man-made terrace well enough drained for coconut palms. (K-2966)

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K-2728. February 17, 1959. Kuttand area, Kerala.
Laterite pit.

K-2728. February 17, 1959. Kuttanad area, Kerala.
Laterite pit.

K-2966. February 17, 1959. Near Mavelikara.
In old paddy fields mounds are built for coconuts. These will be filled to make a higher terrace.

K-2966. February 17, 1959. Near Mavelikara.
In old paddy fields mounds are built for
coconuts. These will be filled to make
a higher terrace.

We pass Kollakadavu. (K-2729) Just beyond is a small cluster of new buildings constructed by the government and leased out to several small industries. With this plan all can have available the necessary services. Several of these are planned outside of the larger towns. This strikes me as an excellent idea.

At 2:35 we stop at the headquarters of a Community Development block at Mavelikara. Mr. Gopinathan Nair is block development officer and we also speak briefly with one or two others (K-2729).

I am told that many of the coconut palms are being injured by a disease of undetermined origin; but a combination of a copper fungicide and DDT helps control it. Bud-rot is also serious.

I am told that most fertilizers here are handled by the cooperatives. In this block there are 4 cooperative societies for better farming but none for joint farming. It is claimed that the village-level workers spend 60 percent of their time on agriculture. Each village-level worker has about 1,500 families that would run to 6,000 to 12,000 people. The staff under the block officers includes officers for agricultural extension, veterinary, cooperatives, engineering, industry, and two for social education - one man and one woman.

I talk very briefly with the man for social education. He says he organizes youth clubs, young farmers' clubs, libraries, and so on. He has distributed 4,000 books to 18 libraries but only 4 of these are new. The woman social worker teaches hygiene, food habits, tailoring, and the like. They are now collecting funds as well as

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K-2729. February 17, 1959. Near Kollakacavu, Kerala. View of a home and characteristic mixed culture.

K-2730. February 17, 1959. Mavelikara, Kerala. Block staff at Mavelikara.

K-2129. February 17, 1959. Near Kollakcavu, Kerala.
View of a home and characteristic mixed culture.

K-2130. February 17, 1959. Mavelikara, Kerala.
Block staff at Mavelikara.

labor and other things of value for a womans' club building. I am quite unimpressed with this work.

In most parts of the State, for a town to have a block office it must give one acre of land.

We are told that the women are interested in family planning but that nothing is really being done. It is said that people here are mainly Jacobite Christians; not many are Catholics.

After this brief discussion while we eat more lunch we continue south. One sees much fewer cattle here than in northern India and no fuel cakes from dung. The houses are much cleaner than in the Punjab.

Soon we are driving over nearly level pale red sand with thatched homes amidst coconut palms. The landscape looks like that of a Ground-Water Podzol. The low fields have rain-fed paddy followed by sesame. In places the soil under the palms is dug up into small heaps about a foot high. (K-2731) In each a cutting of tapioca is planted. Where I stop the soil is a Ground-Water Podzol with a deep A_2 horizon and a very weak B_2 horizon. As we drive on I see mostly a mixed culture of coconuts and tapioca and a rotation of paddy and sesame in the low bunded fields.

We stop to see the coconuts being made into copra. These are husked, and split into 2 half shells. They dry in the sun for 3 days or so. The operator here says he gets Rs 420 for a candy of 600 pounds. (In India a candy varies in weight for different products and for the same product in different areas.) (K-2967)

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K-2731. February 17, 1959. South of Mavelikara, Kerala. Low sandy soil being prepared for tapioca under coconut palm.

K-2731. February 17, 1959. South of Mavelikara, Kerala.
Low sandy soil being prepared for tapioca under
coconut palm.

K-2967. February 17, 1959. Near Mavelikara.
Preparing coconuts for market. The halves in the foreground dry for three days; shells are removed; and after three more days of drying it is called copra.

K-2967. February 17, 1959. Near Maveliikara.
Preparing coconuts for market. The naives in
the foreground dry for three days; shells are
removed; and after three more days of drying
it is called copra.

We go to the sea and come to the coastal road. Here the soils are very sandy Low Humic Gleys and Ground-Water Podzols with very little Ground-Water Laterite. The culture continues to be coconut palm and tapioca with paddy followed by sesame in the low places. From deep borrow pits I see clayey material at 4 to more than 6 feet. In the cultures there are also mangoes and other plants but few bananas. As we go on the sand is quite deep and light reddish brown in color.

We stop near Chavara and walk out on the beach of monazite sands. (K-2732) Here there are fishing boats, fish nets drying, and thatched fishermen's cabins under the coconut palms. Near us is a large plant for the partial processing of the uranium-bearing sands. Processing is completed in Bombay. On the other side is the headquarters of a Norwegian-managed modern fishing headquarters. They have an ice factory and other facilities and are trying to teach these people to do more efficient fishing, especially in the deep sea, and also better handling and marketing. Through their work with the Government of India, they are also getting improvements, including a good water supply, for the villages. Apparently the Norwegians are putting forth a strong effort since the project is headed by a former ambassador.

While here we meet a real bright little boy who wants to be a physician. He is in his last year of high school and only 13.

I am told that there are 54 colleges in Kerala that give bachelor's degrees besides professional schools for medicine,

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K-2732. February 17, 1959. Near Chavara, Kerala.
Sandy ocean beach of monazite.

K-2732. February 17, 1959. Near Chavara, Kerala.
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On beach of monazite sands, February 17, 1959: P. D. Nair, M. S. Nair, L.J.K., and C.E.K. with children of fishing village. (Photo by Dr. R.)

beach of monazite sands, February 17, 1959: P. D. Nair,
S. Nair, L.J.K., and C.E.K. with children of fishing
illage. (Photo by Dr. R.)

engineering, and agriculture. The liberal arts colleges average 500 to 600 students besides master's candidates.

We go on south past the Norwegian factory for ice and the cold storage plant and cross a large estuary on an old one-way plank bridge. For some distance we continue on south on yellowish sand used for coconuts. The area is heavily populated with the fishermen in addition to the others.

At Quilon, a district headquarters, we turn away from the sea and stop for tea at 5:00 p.m. Here there are many cashewnut-processing plants. After leaving the town we are on undulating to rolling low upland soil with a reddish sandy loam surface and weak laterite beneath. Coconut palms dominate but there are also mangoes, jack fruits, peppers, and the like. Many of the slopes have earth bunds. The flat valley land is used for paddy. There are many people to be seen.

We pass Chatanoor village and continue on gently undulating reddish soils; some with laterite. The soils are lithosolic on strong slopes. On the moderate to strong slopes the earth bunds do not hold well. Many are not maintained and erosion results. On the easy slopes are many cashewnuts along with palms, bananas, and the like. The flat valleys have paddy at the lowest level and coconut palms on man-made terraces some 2 to 3 feet higher. After crossing the streams here we commonly go on to the upland through deep cuts with nearly vertical faces of laterite hardened in place, some 19 to 25 feet high.

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We pass Attingal, said to be the first town to vote Communist. We are still on gently rolling upland with laterite beneath and see mixed cultures of palms, mangoes, bananas, cashewnuts and black pepper vines. The drier sites have tapioca and poor cashewnuts. Now the laterite is not so well developed. I am told that here it does not make good bricks. My guides argue a bit and some say that the soils are alkaline, which I doubt exceedingly. We stop to look at some whitish bricks that were cut out of a well at great depth under laterite. I suspect it is bauxite. Now at 6:25 darkness gathers. We next pass a large area used for paddy and somewhat higher land with a rather thin mixture of palms, trees, etc. on reddish sandy loam. Along the road are low mud walls thatched with palm leaves. The palmyra palm leaves are marketed from this area for thatch and other purposes. They are cut, dried, wetted, plaited, and dried again. Some of the small holdings here are rather poorly managed.

We reach the Mascot Hotel at 6:45 and find find we have no reservation for tomorrow!

We clean up a bit in our room and at 7:50 receive a call from Professor A. P. A. Brito-Mutunayagam the Agricultural Chemist here. I was worried at first but he turns out to be a very nice gentleman. He had an M.S. from Cornell about 1935. He tells me that the competition for places in the colleges is very keen. There are 2,000 applications for 100 seats in the medical college and 400 candidates for 80 seats in the agricultural college.

We pass Attingal, said to be the first town to vote Communist. We are still on gently rolling upland with laterite beneath and see mixed cultures of palms, mangoes, bananas, cashewnuts and black pepper vines. The drier sites have tapioca and poor cashewnuts. Now the laterite is not so well developed. I am told that here it does not make good bricks. My guides argue a bit and some say that the soils are alkaline, which I doubt exceedingly. We stop to look at some whitish bricks that were cut out of a well at great depth under laterite. I suspect it is bauxite. Now at 6:25 darkness gathers. We next pass a large area used for paddy and somewhat higher land with a rather thin mixture of palms, trees, etc. on reddish sandy loam. Along the road are low mud walls thatched with palm leaves. The palmyra palm leaves are marketed from this area for thatch and other purposes. They are cut, dried, wetted, plaited, and dried again. Some of the small holdings here are rather poorly managed.

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He doesn't think much of the progress in the Community Development blocks. He says with TCM help they now have a good soil-testing service; but there is no follow through. Although they test many soil samples for cultivators, few actually buy fertilizers because of: (1) lack of funds; (2) short supplies; and (3) late deliveries. I ask about dung fuel and he tells me that none is used in this State.

He takes his leave and we go in for dinner. About 9:00 we go to the room and work on notes for awhile. It is still hot.

This has been a good day. From what one can see from the car this State looks better in almost every way than most other parts of India that I have seen. Some of the small holdings with mixed cultures look very good. I am amazed at the many schools and colleges and at the fine looking boys and girls of all ages.

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February 18

I am up at 7:00 a.m. with many mosquito bites. While having breakfast at 7:30 in comes Mr. Earl I. Bacon, Agricultural Extension Advisor (TCM) from Texas. He says that one-third of the gram sevaks are no good. They lack capacity and training and are nonchalant in attitude. He thinks that the level of living here has improved and that the people are anxious to improve further. Many people are very poor indeed and have only one set of clothing. Fortunately the State is well supplied with electric power.

At a recent meeting the farmers talked about progress from better farming societies to joint farming societies and then to collectives. So far they have had no good success with joint farming. Land owners are very individualistic and most owners do not work their own land, especially owners of paddy land. Although some are larger, he says the average paddy farm is 13 percent of an acre. The owners try to get a government job or else pretend to manage their holdings, but this management doesn't amount to much.

Mr. Bacon says that the people here are quite independent; they listen attentively and then do what they want to. Then Mr. P. D. Nair comes in. Mr. Bacon says that the social workers in the blocks are accomplishing almost nothing. They have no program and only a few find something useful to do. He insists that only the agricultural officers have a program.

Mr. Nair says there is a cabinet meeting this morning and it may be hard to arrange our conferences. So plans are changed for us to drive to Cape Comorin this forenoon and have our conferences

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at 3:30 p.m. Happily, the hotel manager says he can arrange for us to stay here tonight so we won't have to move again. The local language is Malayalam.

After considerable delay we get in the car and start out at 9:41. At this hour there are many people in the streets. There are relatively few bullock carts. These are pulled by small animals, mostly in poor flesh. No doubt their forage is very low in calcium and phosphorus. The people balance their diets with fish, but the bullocks can't do this.

We leave the city and are again on the gently rolling reddish-brown soil with weak laterite under mixed cultures of palms, fruit trees, and bananas.

My guides tell me that Mr. Bacon is doing a very good job here and is extremely well liked in contrast to his predecessor - a Mr. Chandler.

We pass Balaramapuram, a fair-sized market town famous for hand-loom work. Along the road many people carry baskets on the head but I see few bullock carts. We still are on the rolling red soil with weak, discontinuous laterite. The vegetation is a bit less lush. As elsewhere, all the alluvial terraces are bunded for monsoon paddy. On the easy slopes I again see good mixed cultures.

About 10 miles out we pass Neyyattinicara, a small market town. This is beautiful country. Most houses have walls of mud bricks and thatched roofs but others are made of fired bricks and have tile roofs.

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Along here there is grown a "cotton tree" (Bombax malabaricum, or Salmalia m.) (K-2733) The fiber from the small fruits is used for making mattresses. They also have many tamarind trees (K-2734) that have small sour fruits used for condiments. These are dried and used in somewhat the way Westerners use vinegar. The trees grow to large size. In the drier areas there is tapioca, usually mixed with thin coconut palms. Here the earth bunds are fairly well maintained. Along the road are Euphorbia hedges. We pass paddy being harvested from narrow alluvial valleys. We shall soon be out of Karala State into the part of Madras State that was recently in the old State of Travancore and highly developed by them. There is more paddy in that part of old Travancore and Dr. Nair says that even owners living in Kerala are not allowed to take it from Madras State. Thus Kerala lost good paddy land in the south and received Malabar where they are now spending a good deal to develop the formerly neglected land.

We pass Parassazh village and then into Madras State at 18 miles from Trivandrum. Along the border here is a narrow strip of "no man's land" claimed by both States and now administered by Kerala.

We pass Kalikavila, a village market, and come into strongly rolling red soil with many rock outcrops. It is said that the people here are petitioning to come into Kerala State. Here the red soils have discontinuous weak deep laterite. I should call them Red Latosols from granitic drift. I can see high mountains to the south and east.

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K-2733. February 18, 1959. 12 miles south of Trivandrum. "Cotton tree" with mangoes.

K-2734. February 18, 1959. 12 miles south of Trivandrum. Tamarind tree - the large one.

K-2133. February 18, 1959. 12 miles south of Trivandrum.
"Cotton tree" with mangoes.

K-2134. February 18, 1959. 12 miles south of Trivandrum.
Tamarind tree - the large one.

There is still mixed cultures and the vegetation not so lush. I am told there is no soil conservation program here. Nine miles below the border are many cashewnut trees and palmyra palm along with coconuts, mangoes, bananas, and paddy in the lowlands.

We pass Thuckala, a fair-sized market town. Here too is gently rolling fairly deep red soil with mixed culture, mainly palms but also many tamarind trees. Now we see the lower part of the Western Ghats, which here are very steeply sloping, nearly barren granite.

We cross a large paddy area where they get two crops with about 2,800 and 3,000 pounds per acre per season. (K-2735) They use some green manure and cattle manure and fertilizers. The cultivators also use fungicides and insecticides on the paddy against stem borers and leaf diseases. We pass more large areas of paddy being harvested and a little newly planted. Most of the old paddy is lodged. Apparently they have a good irrigation system.

We drive between two rocky peaks and out onto more good paddy. It is said that nearly all of this is harvested and threshed under contract with unionized labor. They harvest in early morning and early afternoon and thresh in late morning and late afternoon because it is too hot for the bullocks in the middle of the day! The paddy is laid out on a threshing floor and walked on by a string of bullocks tied together and to a central post. Then the straw is shaken and lifted with a fork and the grain swept up and winnowed.

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K-2735. February 18, 1959. South of Trivandrum. Harvesting good paddy with two crops giving about 2,000 pounds per acre.

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about 2,000 pounds per acre.

We pass Parvathipuram. Here I see goats, cattle, and sheep being grazed on the stubble after paddy harvest. (K-2736; K-2737) Of course land owners get a fee for this. At night the sheep are folded on the paddy fields.

There are only a few small bullocks to be seen but some buffalo. Little donkeys are used for carrying burdens; but most burdens are carried by people on the heads, including the paddy sheaves from the fields. It is said that St. Thomas first visited this part of India.

We pass Nagercoil, a district headquarters and a large market town with godowns for paddy. I am told that 6 or 7 large operators dominate the market. On the uplands here towns and villages merge with one another. We see more large irrigated tracts of paddy. Here there are more bullock carts hauling paddy, paddy straw, bananas, pottery, tiles for roofs, etc.

We pause at Suchindram to see a famous temple said to be some 2,000 years old. (K-2738) Only Hindus may enter. It is a large temple with almost unbelievably elaborate carvings of figures, including long serpentine narrow ledges to suggest the waves of the sea.

In the already harvested paddy fields are curious small basket-like portable huts about 3 feet high and 6 feet in diameter for the sheep herders. I see heaps of cattle dung covered with red earth to save it for the planting season. We pass a famous hill in Indian history named Maruthi Mala about 5 miles north of the Cape. In paddy fields here I see some ducks.

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K-2736. February 18, 1959. Near Parvathipuram.
Goats and cattle after paddy.

K-2737. February 18, 1959. Near Parvathipuram.
Hairy sheep on the road.

K-2736. February 18, 1959. Near Paravathipuram.
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K-2737. February 18, 1959. Near Paravathipuram.
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K-2738. February 18, 1959. Suchindram.
View of temple.

K-2138. February 18, 1959. Suchindram.
View of temple.

We go on over undulating red light sandy clay loam or sandy loam. It is hot, sunny, dry, and windy. Much of the soil has no ground cover. It is said that the rainfall is down to 24 inches. There are a few small cathedral-type termite mounds. I see a few palms but mainly small thorny acacia. Near the sea the sand has drifted a bit.

We enter Cape Comorin and can see at once the Bay of Bengal, the Indian Ocean, and the Arabian Sea. At the most southern point is an elaborate Gandhi Memorial.

The temple here is being repaired and cannot be photographed. It is so hot that few people are about.

About 12:15 we start back to Trivandrum along the same road. What a pity that we must hurry so! It must be very hot indeed at work in these paddy fields now - too hot for bullocks to thresh but all right for men and women to cut, bind, and carry the paddy to the threshing floors! Paddy is bound in small sheaves. Several of these are tied in a huge bundle and carried on the head at a slow trot. Even along here I see a few old banyan trees. Just here near the Cape the first crop of paddy is broadcast and the second crop is transplanted. I am told that the first gives 1,000 pounds and the second 4,000 pounds or better per acre. This well-irrigated paddy land is held at Rs 15,000 per acre.

Near Trivandrum I see several string of goats tied together with rope being taken to the butchers. They do not follow one another but walk down the road abreast.

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K-2739. February 18, 1959. Cape Comorin.
View of Gandhi Memorial.

K-2139. February 18, 1959. Cape Comorin.
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Cape Comorin, February 18, 1959
L.J.K. (Photo by Dr. R.)

Cape Comorin, February 18, 1959
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We are back to the hotel at 2:25 after a very fast return with the tires squeaking on all the curves. We change quickly and have lunch. There comes to meet us Mr. V. Gopala Swamy, a student of Dr. Raychaudhuri, who says he works on the cat clays (I wonder what he does) and was with us yesterday. Dr. Nair and Dr. Raychaudhuri come and at about 3:25 we arrive at the office of the Minister of Agriculture, Shri C. Achutha Menon. Present also are: K. Sivasankara Menon, Director of Agriculture; Mr. P. D. Nair; Shri M.Abdussalam, Chief Secretary; and a few other staff members.

The Minister does not speak forcibly. The Chief Secretary, who is also the Community Development Commissioner, somewhat dominates the conversation. I am told that one-half the State is in blocks but the program is not so good as they had hoped. Some of the agricultural officers do not like to work in the blocks so well as outside. Now fertilizers are distributed by private companies, by the Department of Agriculture, and by cooperative societies. The last take about 8 lakhs out of 75 lakhs of the business. Formerly the cooperatives could get the fertilizer on credit but that is no longer permitted. They must pay cash but they can get loans from the banks. The government holds half the shares of the private companies. These have 700 retail outlets. Fertilizers are made in Alwaye, including ammonium sulphate, superphosphate, and ammonium chloride. Not much of the latter is used as fertilizer. They plan to make ammonium phosphate. They do not use all of the superphosphate;

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but the government gives a 25 percent subsidy on bone meal. They have only 13.5 thousand tons of fertilizer. They could have distributed 25,000 and need much more.

Only a few of the extension officers have any training in soil conservation. It is agreed that they should prepare the way and the actual conservation work be done by more specifically trained people.

They have a few joint-farming societies but they expect little pooling of privately owned land for a long time.

The women get help through the extension blocks on embroidery, nutrition, hygiene, and the like.

Poultry farming is increasing. They have both ducks and chickens. The staff then discuss some of their major problems.

1. More popularization of good farming methods.

2. They need more fertilizers, including especially potash for coconut palms. They have made some progress with increased city compost. They give me campaign leaflets for increasing the growing of green manures, especially Glyricidia maculata and other trees.

3. Land consolidation is said not to be so important here. Most small farms under 5 acres are in one parcel. But where they are not, consolidation is very difficult because of the intricate pattern of contrasting soils and rock outcrop. Unhappily, they have no law to prevent further splitting of the tiny holdings through inheritance.

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4. The Ministry here favors low price supports but is much afraid of high price supports since the State produces only one-half of its food.

5. They have done a lot on water storage for irrigation and need to do much more. The work is very expensive because of the many narrow valleys (but I should think also because of the high value of the tiny farms that would be flooded).

6. They now have 70,000 acres under teak and plan to develop 4,000 more each year. The trees are used for electric poles, furniture, etc.

7. They hope to expand rubber. They now have 2 lakhs of acres under rubber that accounts for 98 percent of India's production. A new government plantation of 8,000 acres is to be made from scrub forest hill land.

8. We discuss other crops, especially cacao and African oil palm. They plan 2,000 acres of cacao but I recommend gradual testing for both these crops. It will be difficult to work out fertilizer practices for them on these soils and I'm afraid the air humidity may be too low part of the time.

The Director of Agriculture seems to be a very agreeable man and he and Dr. M. S. Nair appear to get along well.

We leave at 4:45. I take a quick look at the Emporium and the current Exhibition, neither of which are very interesting and the second is very noisy.

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I am back to the hotel at 6:15 for tea. We rest a bit. It is still hot.

In the evening we have dinner chez P. D. Nair, which is very pleasant.

We are back to the hotel at 10:30. Our Indian friends told us today that essentially all marriages here are arranged, although prospective brides and bridegrooms have a chance to see one another and either can veto the match. The bride wants a pretty husband; her mother wants a wealthy son-in-law; and the girl's father wants a wise and learned son-in-law. (One doubts that many get all three.)

And so to bed.

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February 19

We have early tea and Mr. Earl I. Bacon comes at 7:40 and takes us to his home for breakfast. He says that the big needs in Kerala are for more nearly adequate research and for economic evaluations to go with the demonstrations to cultivators.

Mr. Bacon obviously likes people. He speaks highly of Dr. M. S. Nair. He says that P. D. Nair was an able man but too much of a stickler for reports. The boys sent him what they knew he wanted. Finally, he recorded mpre paddy by the Japanese method in the State than the total crop. This was too much for the Minister and he was not asked to continue as Director. (He had already been retired and was being continued from year to year.)

He says that Minister Dey dropped into one of his training sessions where he had 100 young officers, listened a while, and then said publicly, "If this is what you are teaching you may as well dismiss them." Dey tried to humiliate him and talked against him with the Minister. But the Government of Kerala gave him no notice.

He says that the Communists are well organized and are teaching a consistent line through the local organizations. He says that the top staff of the government, including the Minister of Agriculture and especially the Chief Secretary, are very bright and know exactly what they are doing. A very few people run the show. Here the ideas come from the Soviet Union and not much from Red China. He expects other State Governments to have Communist ministers, especially

February 19

We have early tea and Mr. Earl I. Bacon comes at 7:40 and takes us to his home for breakfast. He says that the big needs in Kerala are for more nearly adequate research and for economic evaluations to go with the demonstrations to cultivators.

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West Bengal and Bihar. But now they are anxious to get all they can from the Americans. (I do not know that he really has a basis for all of this.)

Obviously Mr. Bacon does not hold the TCM leadership in Delhi in high regard. He feels they don't get out in the country and into the villages enough to understand the problems.

He says that he has been very careful here to avoid intrigues. Apparently his predecessor got into trouble from over drinking so Bacon says he just avoids it. He says that all of the officials whether Communist Party members or not must follow the policy.

He argues for the extension officers only to prepare the way for soil conservation. He thinks the problem is so important that it would be better to have a separate department for it in the Ministry.

Mr. Bacon says that the trade unions are becoming very strong. These are dominated by Communist Party members and a worker must join to get a job.

He shows me his draft report, which looks good. He stresses fertilizers and green manures. In his extension training schools he himself teaches the extension methods with much field work but uses the local Indian experts for soil science, agronomy, and the like.

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I return to the hotel and chat for a few minutes with the present Director of Agriculture who thinks that strong cooperatives will be a long time in coming.

We leave the hotel at 9:50 and take a quick look at a fishing village on the sandy beach and then check in at the air station about 10:10. We meet another Mr. Nair - a young soil survey worker. He tells us that the name "Nair" is a caste name.

We are in the plane and leave for Coimbatore at 10:57. At first we go a bit out to sea and north along the yellow sandy beach. Then the plane turns over the land. This landscape is very difficult to describe. It has an intricate pattern of winding valleys among the peninsulas and islands of uplands. Some of the hills are a bit steep and droughty. These should have masonry bunds. It will be very difficult to supply irrigation water to all these little valleys. (See drawing.)

From the plane the areas recently planted to tapioca appear to be nearly barren. In a few minutes we pass over the great Kuttand area with both small and large areas of green paddy. Large canals

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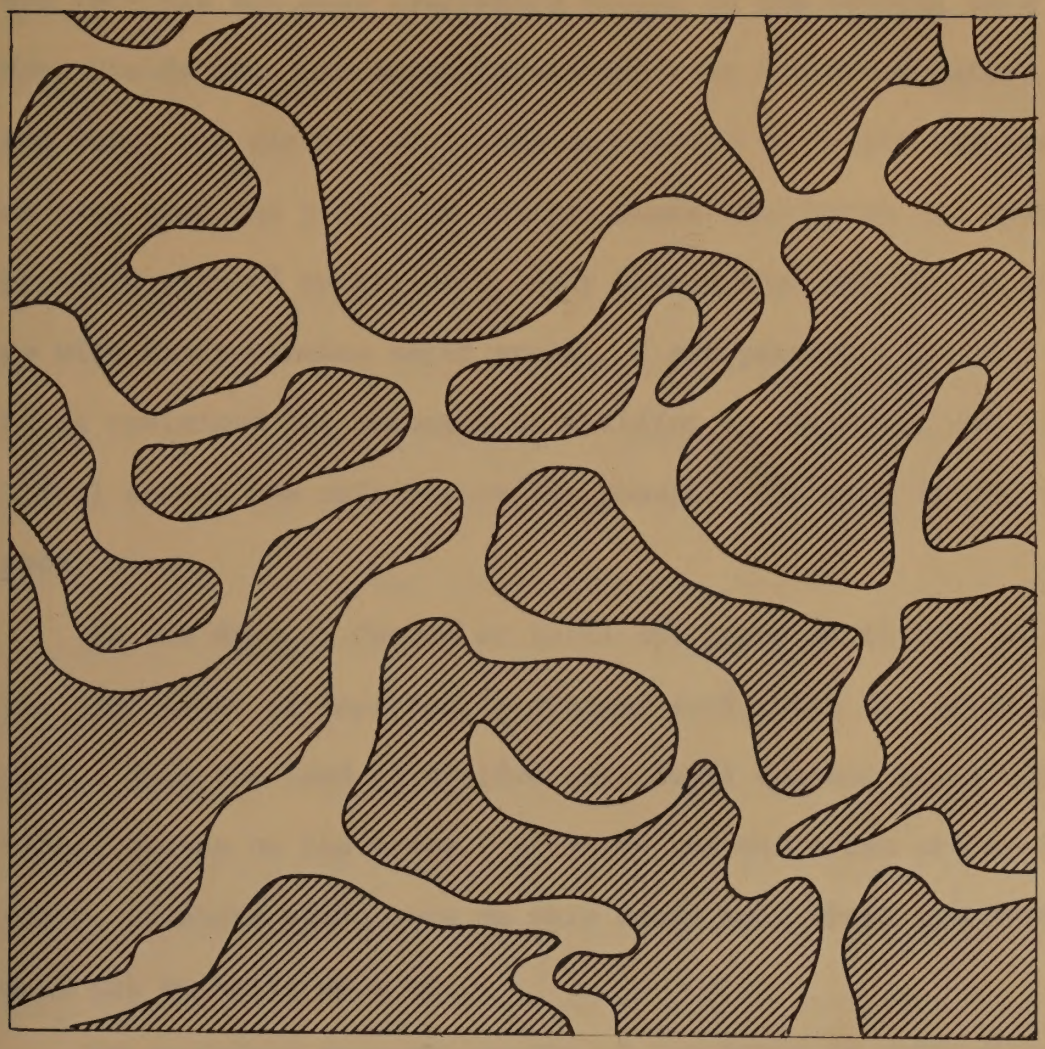

Red soil with laterite at 12 to 20 inches

Gray paddy soil

The pattern of soils in much of Kerala State between the beach and hills.

and laterals are seen everywhere except in the central lake area. Many fields are just being harvested; some are under water. Near the lake, the pattern of fields and canals is fairly regular. Then we pass over the yellowish coastal sands with palms and open areas probably planted to tapioca. Near Cochin the land is wet and cut up with discontinuous water areas. I see patches with high bunds being reclaimed for coconuts by building up with silt and sand. I fail to see how cultivators can possibly use some of the very wet paddy areas.

We are down in Cochin at 11:41 and leave at 12:07. At once we are over areas of imperfectly drained soil, with dry sandy surface soil. Here the land is divided into small coconut farms with individual houses on the farms. Although the wet areas are used for paddy, coconuts yield more on this sandy soil where the sandy wet soil can be built up a bit.

We go inland over the region of low hills of reddish soil and small serpentine valleys. Some paddy fields are green but most are not. We also cross some fairly large winding streams. Now the beds are sandy but I suspect they flood widely during the monsoon. Then we come into the higher hills. Some seem to have fair forest. It seems to me that these low mountains may have had some clearing and burning at one time, perhaps for pasture. Now I see almost no farms.

Out 23 minutes from Cochin we leave the Western Ghats and come onto the great plain of undulating reddish-brown and red soil. Fields are laid out on nearly all of it. Where water is available they have

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cotton, sugarcane, fruit, and perhaps some paddy. Near Coimbatore these green areas make up perhaps 5 to 10 percent of the landscape. Villages are quite thick.

We are down at Coimbatore at 12:45.

To meet us are Dr. Govindanrajan from Bangalore, and D. John Durairaj, T. R. Srinwasan, P. V. Anantharaman, and E. K. Rajagopal from the Agricultural College at Coimbatore. We leave the airport at 1:05. The air temperature is 91° but it seems much hotter in the sun. Coimbatore has a population of 200,000, many of whom work in several textile mills. This is a smooth plain with some irrigation, especially on cotton. The dryland jowar crop has been harvested. I see some millet along with a little irrigated sugarcane and young paddy. Coconuts and bananas are grown in gardens. They grow a short-staple cotton here. The few fields without irrigation have a very poor crop. In places the dark red soil is underlain with tilted, metamorphosed rock that had been planed off by early stream action.

We drive along the edge of the city to the Coimbatore Agricultural College and Research Institute. We have tea and I give a short lecture to the soil science and agricultural chemistry staff on soil conservation with particular emphasis on combined practices.

Although I shouldn't take the time, I am persuaded to go look at a soil profile made incidental to preparing the foundations for a new building. This is a Tropical Black Clay. The surface 26 inches is a nearly black (10YR 3/1) clay loam. From 26 inches to 44 inches is gray nodular kankar, partially consolidated. Beneath is rather loose, limy, old alluvium.

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Coimbatore, February 19, 1959. C.E.K. with students and staff in agricultural chemistry at the Agricultural College. (Photo by Dr. R.)

Coimbatore, February 19, 1959. C.E.K. examining black soil ("Karisol") at Agricultural College. (Photo by Dr. R.)

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Village of Mettupalayam on way to Ootacamund, February 19, 1959. Threshing paddy. C.E.K. left center. (Photo by Dr. R.)

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I take kodachromes in a great hurry. In places I see artifacts in the upper 18 inches.

We take the road for Ootacamund, first on this nearly flat red soil. I see cotton, sugarcane, palmyra palm, tamarind trees along the road, pruned bananas, coconuts, fallow, much cotton, quite a bit of overgrazed uncropped land, some tobacco, sugarcane, tapioca, sugarcane, cotton, fallow, papaya, coconuts, tapioca, sugarcane, bananas plus coconuts, and a little wasteland. As we drive on the soil gets more sloping with crops only on the easy slopes. Some of these are terraced, including areas not yet used for crops. I see mangoes, cotton, small fields of paddy and tobacco, bananas, and sugarcane. We see Euphorbia and mesquite-like hedges part of the way. As we approach the mountains the relief is more irregular and some of the soil is shallow and rocky.

We pass Karamadai, a small market town. Then I see grazing sheep, harvested jowar fields, tobacco, and castor beans.

We pass Mettupalayam near the mountains and cross the Kattra River.

We are now on a rather small area of well irrigated soil. We see chilies, arecanut palm, bananas, cotton, and paddy.

We stop to take pictures of people winnowing paddy following its trampling by bullocks. (K-2740; K-2741; K-2742)

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K-2740. February 19, 1959. About 20 miles north of Coimbatore.
Winnowed paddy after threshing.

K-2741. February 19, 1959. About 20 miles north of Coimbatore.
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K-2740. February 19, 1959. About 20 miles north of Coimbatore.
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K-2742. February 19, 1959. About 20 miles north of Coimbatore.
Another view of winnowing paddy after threshing.

K-2142. February 19, 1959. About 20 miles north of Coimbatore.
Another view of winnowing paddy after threshing.

The road then climbs up on the terrace in front of the mountains. We pass dense plantings of arecanut palms. The winding road takes us along the beautiful steep mountain valley around many curves and 13 narrow hairpin bends.

Near the top we pass Coona and drive through the beautiful Ooty valley with strongly sloping deep Reddish-Brown Latosols terraced for potatoes. Plantings of eucalyptus for oil are scattered about.

We reach the Savoy Hotel at 6:10. The elevation here is 7,400 feet and the cool evening is a welcome change.

We have dinner at 8:00 and are early to bed.

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February 20

This is a cool sunny morning. The gardens are nice. Immediately after breakfast I leave at 7:50 for the soil conservation office to give a brief lecture on soil conservation. I look hurriedly at the soil survey maps here and insist that they must reproduce some copies showing the boundaries among the individual plots.

The boys insist on taking me to look at a soil profile in the mountains. I note that since my visit last year a lot more terracing has been done, mostly for potatoes. These terraces have high faces of 4 to 6 feet and, ideally, with a slight back slope and with a vertical drainage ditch, with plunge basins, directly down the slope. I am told that this land is held at Rs 6,000 per acre. The bunding runs around Rs 500 per acre. The rainfall here is somewhat over 60 inches fairly well distributed except for little rain in February and March. But with the high elevation, temperature and evaporation are low. In fact, frost is a hazard on the higher slopes. Although they grow vegetables, potatoes account for most cultivation. Most have 3 crops of potatoes each year. Potatoes are planted in September, February, and June. (K-2744; K-2745; K-2743; K-2746)

We drive by cinchona and eucalyptus plantings to the profile of Reddish-Brown Latosol on a slope of 30 to 40 percent. Here the forest is eucalyptus with a 75 percent ground cover of short grass and some low shrubs. The parent material is weathered from a rather basic granitic gneiss. I suspect some influence of dolorite. Although there has been some slipping here, the profile is mature. It has an amazingly low erodibility.

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Ootacamund, February 20, 1959. C.E.K. with staff of Soil Conservation Research, Training, and Demonstration Centre. (Photo by Dr. R.)

Ootacamund, February 20, 1959. C.E.K. examines Reddish-Brown Latosol. (Photo by Dr. R.)

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DR. E.W. RUSHING AND STAFF OF SOIL
CONSERVATION RESEARCH, TRAINING &
DEMONSTRATION CENTRE, PATNA HOUSE
OOTACAMUND (20.2.1959)

Ootacamund, February 20, 1959. O.R.K. with staff of Soil Conservation Research, Training, and Demonstration Centre. (Photo by Dr. R.)

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DOES A GET
ARCHITECT A
HOUSE

Ootacamund, February 20, 1959. O.R.K. examines Reddish-Brown Laterite. (Photo by Dr. R.)

K-2744. February 20, 1959. Near Ootacamund.
Characteristic terraces on Reddish-Brown Latosol.

K-2745. February 20, 1959. Near Ootacamund.
Terracing on strongly sloping Reddish-Brown Latosol for potatoes.

K-274. February 20, 1959. Near Ostacamund.
Characteristic terraces on Reddish-Brown Latosol.

K-275. February 20, 1959. Near Ostacamund.
Terracing on strongly sloping Reddish-Brown
Latosol for potatoes.

K-2743. February 20, 1959. Near Ootacamund.
Characteristic terraces.

K-2746. February 20, 1959. Near Ootacamund.
Another view of terracing on strongly
sloping Reddish-Brown Latosol for potatoes.

K-2743. February 20, 1959. Near Ootacamund.
Characteristic terrace.

K-2746. February 20, 1959. Near Ootacamund.
Another view of terracing on strongly
sloping Reddish-Brown laterite for potatoes.

A_1	0 - 6"	Dark yellowish brown (10YR 4/4) silty clay loam with irregular coarse granular structure. Fairly friable. Many roots. Gradual boundary.
A_2	6 - 18"	Horizon thickness varies considerably. Brown (7.5YR 4/4) silty clay loam that digs out in clods that are friable to mixed granular and small blocky
AB	18 - 24"	Transition of variable thickness.
B_2	24 - 60"	Dark reddish-brown (2.5YR 3/4) clay that digs out in clods that are easily friable to quite stable granular. In place, the soil has a slight coarse prismatic breakage. It has many open root channels. When wet the soil is fairly sticky, more so than the horizons above and below. There are many small reddish-brown concretions in the upper part of the B. The upper boundary is fairly clear and the lower one gradual. There are no evidences of clayskins.
B_3 - C	60 - 80"	Reddish-brown (5YR 4/4) silty clay to clay. The soil is firm and nearly massive in place but digs out in easily friable clods. Roots penetrate more than 7 feet.

My guides have mistaken the normal formation of concretions for a stone line. Of course, there are great variations in depth and color. In some places the parent material is almost white.

We go back to the hotel where I finish packing in a big hurry. We are already late. My Indian guides simply have no concept of time or distance so we shall be in Bangalore after dark.

I meet Mr. Ananda Rao, Chief Scientific Officer of the United Planters Association for South India.

We leave at 11:00 a.m. toward Mysore and are soon in a hilly area with mixed forest and grassland heavily grazed by sheep. Along the road women crack the blasted rocks into small pieces with hammers

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DODDA BETTA CINCHONA PLANTATION:

The area is well known for the cultivation of medicinal plants such as Cinchona, Eucalyptus, Digitalis, etc. It is about a mile due north from the highest point of Southern India(8,647' above M.S.L) known asDodda Betta peak. Out crops of Charnokite rocks are most common in the locality.

Location:- The pit is situated at about 4 furlongs due north east of the hand post, on the main Kotagiri-Ootacamund road; in old survey No.D 132 of Rural Ootacamund belonging to the above plantation.

Elevation:- About 8,200' above M.S.L.

Rainfall:- Varies from 45" to 70" per annum.

Temperature)
variation:-) Minimum 25°F. Maximum 90°F.

Topography:- Highly hilly with terrific slopes.

Vegetation:- Forage grasses cover the surface, Eucalyptus plantation. The nearby sholas contain small to tall trees of various species such as Michelia, Camellia, Ilex, Sideroxylon, etc.

A1 - A_0 0" - 6" : 7.5YR4/4, Dark brown, loam to silty clay loam, semi compact granular, pH about 6.0, no eff with acid, abundant roots, moderate permeability, rich in organic matter. Well drained. Colluvium.

A_2 6" - 18": 7.5YR5/4, Brown, silty clay loam, moderately massive, slightly hard, pH about 6.0, no eff with acid, roots present. Moderately slow permeability. Moderate to well drained. Colluvium.

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B1 A_2: 18"-26" M 5YR3/3, Drak Reddish Brown, silty clay loam, moderately massive. Slightly hard, stone line consisting of weathered iron concretions and small quartz particles. Moderately drained. Roots present.

B_2: 26"-55" M 5YR3/3, Dark reddish brown, silty clay loam. Moderately Massive, pH about 5.5, no eff with acid, stone line conspicuous with weathered iron concretions and very few particles of quartz. Few faint yellow mottlings. Moderately slow permeability roots very few.

B_3: 55"-80" M. 7.5YR5/6, strong brown, clay, Massive and firm structure, few black and yellow mottlings present, pH about 5.5; no eff with acid, roots absent. Very slowly drained.

[This description had been made by my guide and was handed to me just as we looked at the profile this morning of February 20, in the Oty Valley.]

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DODDA BETTA GIRIJAMMA PLANTATION:

The area is well known for the cultivation of medicinal plants such as Cinchona, Ipecacuanha, Digitalis, etc. It is about a mile due north from the highest point of Southern India (8,647' above M.S.L.) known as Dodda Betta peak. Out crops of Charnockite rocks are most common in the locality.

Location:- The site is situated at about 4 furlongs due north east of the Hunt peak, on the main Kotagiri-Ootacamund road in old survey No.D 182 of Ural Ootacamund belonging to the above plantation.

Elevation:- About 8,200' above M.S.L.

Rainfall:- Varies from 45" to 70" per annum.

Temperature variation:- Minimum 25°F. Maximum 90°F.

Topography:- Highly hilly with terrific slopes.

Vegetation:- Forage grasses cover the surface, Eucalyptus plantation. The nearby shola contain small to tall trees of various species such as Michelia, Cinnamomum, Ilex, Rhododendron, etc.

A: 0" - 6" : 7.5YR4/4, Dark brown, loam to silty clay loam, coarse compact granular, pH about 6.0, no effervescence with acid, abundant roots, moderate permeability, rich in organic matter. Well drained. Colluvium.

A1: 6" - 18": 7.5YR5/4, Brown, silty clay loam, moderately massive, slightly hard, pH about 6.0, no effervescence with acid, roots present. Moderately slow permeability. Moderate to well drained. Colluvium.

A2: 18"-36" N 5YR3/3, Dark reddish brown, silty clay loam, moderately massive. Slightly hard, slope line concreting or weathered iron concretions and small quartz particles. Moderately drained. Roots present.

B1: 36"-55" N 5YR3/3, Dark reddish brown, silty clay loam. Moderately massive, pH about 5.5, no effervescence with acid, slope line conglomerate with weathered iron concretions and very few particles of quartz. Few faint yellow mottlings. Moderately slow permeability roots very few.

B2: 55"-60" N. 7.5YR5/6, strong brown, clay, massive soft firm structure, few black and yellow mottlings present, pH about 5.5; no effervescence with acid, roots absent. Very slowly drained.

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for road material. Many patches of land here have been taken over by gorse run wild. We pass a large area of some 20,000 acres (said to be the largest "down" in India) of grassland with forest in pockets and on the critical slopes subject to slipping.

We pass a large protected planting of wattle in the catchment area of Pykara Dam. It is drier here, perhaps partly from lower rainfall and partly from higher temperature. We are still on Reddish-Brown Latosols. We pass some nice plantings of tea under wattle and silver oak. One planting has just been pruned for new growth. (K-2747) We see some beautiful flowering trees and large scarlet rhododendrons. These tea estates are terraced but in preparing the land from rough forest there is some erosion.

We pass some cinchona plantings. We are now going down a steep mountain on a very winding road. The soils are probably lithosolic Red Latosols. Below 5,000 feet we begin to see termite mounds.

We then drive west off the main road onto a hilly winding side road. There are many bamboo thickets and both tea and coffee under thin shade on hilly Red Latosol. We see small fields of paddy in the lowlands and bananas in the gardens. We pass Devershola, a little village and come to the headquarters for tea research by United Planters Association for South India. The rainfall here is said to be about 75 inches. Certainly the air and surface soil are dry now.

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K-2747. February 20, 1959. 7 miles north of Ootacamund. Recently pruned tea under wattle. The large trees are silver oak.

K-2144. February 20, 1959. 7 miles north of Gotscamund. Recently pruned tea under wattle. The large trees are silver oak.

I am told that it costs about Rs 4,000 to 5,000 per acre to bring rough forest land into a bearing tea garden within 4 to 5 years. The first normal crop comes at 6 years. The small tea leaves are picked once a week and the large ones left to nourish the plant. Once every 4 to 5 years the tea plants are pruned back to only a few inches above the ground. It is said that 1,400 to 1,500 pounds of dry leaves ("made tea") per acre is a good yield and that the average yield is about 850 pounds.

It is said that 250 acres is the minimum size for an operating tea estate; several exceed 1,000 acres; and the average is about 600 acres.

For each 100 pounds of dry tea they add 8 pounds of nitrogen, 3 pounds of P_2O_5, and 4 pounds of K_2O. Coffee in this district gets less fertilizer. They now are getting only one-half the amount of ammonium sulphate required. They don't like urea because they claim they can't keep it in good condition except in mixtures where it is less than 20 percent! (They must have confused the urea with ammonium nitrate.) Mr. Rao says they have no difficulty getting all the potash they want! He claims that the difficulty with ammonium sulphate imports is not primarily foreign exchange but competition with local plants. (I have seen no evidence that he is correct on this point. In most places it is harder to get the potash than the ammonium sulphate.) When the tea is picked it is first wilted slowly to 60 percent moisture and then dried. The dry tea comes to 23 percent of the green leaf.

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We can look only briefly at the laboratory. They make soil tests and they test all proposed pesticides in order to avoid any that influence the taste of the tea.

We have tea and a picnic lunch in the bungalow. Mr. Rao says that one needs 3 laborers for each 2 acres. According to local custom, to hire a man one must also hire his wife so they may come together. Primary and secondary schools are available. Workers get free housing and medical attention. They are paid their expenses home once a year. They are also furnished water and given gardens. The estates furnish nurseries for the children of working mothers and give them their noon meal. By law minimum wages for men are Rs 1.7 and for women Rs 1.31; most women are paid according to what they pick. They may earn as much as 2 or 3 rupees. Tea is picked during all the year, but two periods - April and May and September and October-are the heavy seasons.

Both the workers and the employers make contributions to a fund and the amount credited to each individual is paid to him when he leaves. We are told that all the laborers of the tea estates are unionized. Some are led by the Congress Party, some by the Communist Party, and so on. Mr. Rao says that it is difficult to get rid of a poor laborer. So they try to be very careful in selection.

We leave the Station at 1:35 p.m. and I notice some hillside plantings of Guatemala grass used for mulching the tea. We are back on the main road at 2:00 p.m., some 68 miles north of Mysore. (K-2748)

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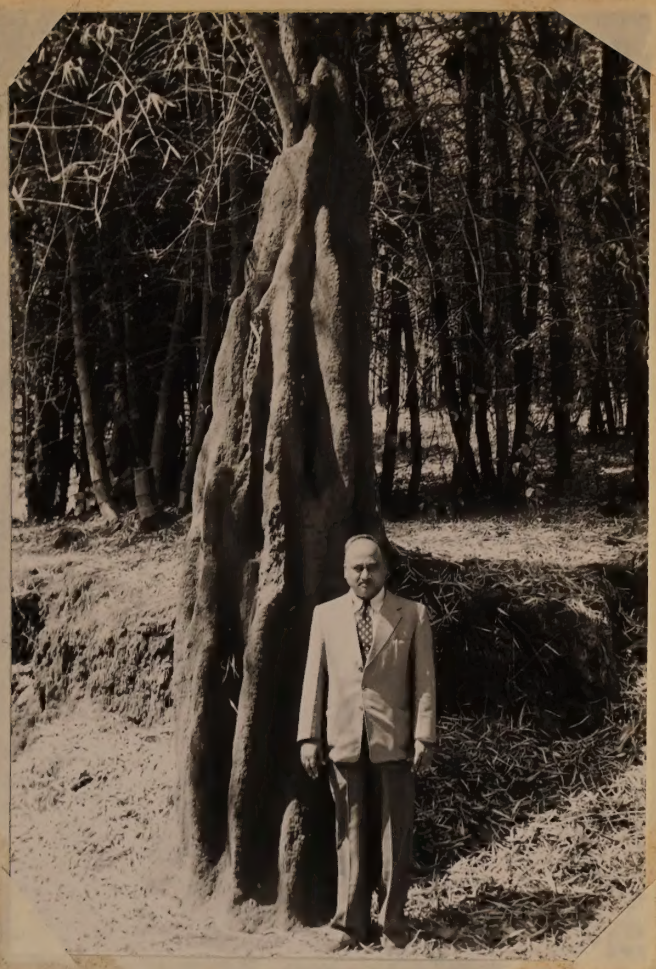

K-2748. February 20, 1959. 34 miles north of Ootacamund. Termite mound with Dr. Govindanrajan.

K-2748. February 20, 1959. 34 miles north of Obscamund. Thrusts mound with Dr. Govindsamy Jan.

65 miles south of Mysore, February 20, 1959:
C.E.K. and L.J.K. beside termite mound.
(Photo by Dr. R.)

22

MR.G.E.KELLOGG AND DR.C.E.KELLOGG
AT THE SIDE OF ART-HILL AT 64TH
MILE SOUTH OF MYSORE ON MYSORE-
KOTAGANURU ROAD (20.2.1959).

65 miles south of Mysore, February 20, 1959:
G.E.K. and L.L.K. beside termite mound.
(Photo by Dr. K.)

We enter a large public sanctuary maintained in forest. Some teak plantings are being made after clearing out bamboo jungle. Although part is hilly there is a goodly percentage of soil here that would be suitable for crops. Most of the soil is dark reddish-brown but some on the easy slopes is almost black.

About 2:35 we pass from Madras State to Mysore State, still within the public sanctuary. We see a few small tribal villages of miserable thatched huts. The old black-faced monkey scampers up the trees. Here it is very dry. Part of the land has bamboo thickets and part dry woodland with brushy undergrowth. We see an elephant standing in a stream - apparently a tame one.

About 2:50 p.m. we come to the great plain of Mysore some 131 miles from Bangalore. It has mostly undulating to gently sloping red soil, perhaps somewhere between Red Latosol and Reddish Chestnut. Some of the nearly level areas are very dark gray to black. A main crop here is jowar of the Kharif season. They will sow cajanus, a pulse, for harvest in June and jowar will be sown in August.

(See India Journal 1958 pp. 116-124 for a more detailed crop log.)

We see a little paddy in the low places. There is active erosion where water is concentrated, as in highway culverts or breaks in bunds, but not so much as near Bangalore. There are patches and strips of black soil apparently related to differences in parent material and in drainage.

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There are lots of monkeys along the road. This relatively dry red soil continues on and on. We see some mangoes, poor coconut palms, and palmyra palms. In the saline areas are worthless wild date palms.

We pass many bullock carts loaded with firewood but see little activity in the fields. Near Mysore there are tanks for irrigating bananas, coconuts, mulberries, vegetables, and some fodder crops.

We stop for tea in Mysore and drive around to see the Maharajah's Palace. Then we go on towards Bangalore. We pass densely cultivated and irrigated alluvial areas with coconut palms and many vegetables. We also see good paddy land. One crop a year is said to give 3,500 to 6,000 pounds per acre. (K-2749)

Our driver is now going like mad to make Bangalore before dark but this he will be unable to do.

With heavy machines for land forming and bunding great improvements could be made here. I see several good patches of irrigated sugarcane and paddy.

From Mysore on one sees more distinct poor sections for Harijans in the towns and villages.

It gets dark about 6:50 and we come to the West End Hotel about 7:15. To my amazement there are no reservations despite Govindanrajan's promise in Delhi to do it and his assurance yesterday in Coimbatore that he had done it. Now he tells me that he really meant that somebody else had told him that somebody else would do it or had done it! I am afraid he is not trustworthy. We go over to the Central Hotel of much lower standard. At 8:30 we have a poor dinner, then work on notes, and go to bed.

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K-2749. February 20, 1959. A few miles northeast of Mysore. A slope terraced for paddy. One good crop gives 3,500 to 6,000 pounds.

K-2149. February 20, 1959. A few miles northeast of Mysore.
A slope terraced for paddy. One good crop gives
3,500 to 6,000 pounds.

February 21

I sleep well until the dogs begin to bark with the coming of dawn. This hotel has seen much better days. The bearer brings tea at 7:00. We pack and go down to breakfast. Despite Dr. Uppal's suggestion, I decide to cancel the planned long trip back to Mysore this afternoon to see the evening illuminations. My back says, no!

We work on the notes until Dr. Raychaudhuri and Dr. Govindanrajan come at 9:00. We put in our bags and go to the West End Hotel where Mommy registers while I go on to see the Director of Agriculture, Shri M. Mallaraj Urs. When we first arrive he is not yet there so we check our tickets at the air office and return as he comes in. He tells me that nearly one-half of Mysore State is organized for Community Development by tahisils (roughly equals counties), although a few large ones have 2 blocks. By 1962 they hope to have all the State so organized. Happily, the Chief Secretary in this State is the Development Commissioner. He has an Additional Commissioner to assist him.

The Director suggests that we call on the Chief Secretary. He rings him up and we go over immediately into a beautiful new building of granite finished inside with teak.

Except for the Director, informed by Dr. Basu, the officials at Bangalore have essentially no information about my visit even though the Foundation had more than a week to tell them.

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Almost immediately the Chief Secretary, Shri P. V. R. Rao, plans that we take a trip north to visit a large meeting of block development officers. Here we go again! Mr. Rao strikes me as a very keen man. He holds frequent meetings of the department heads in various parts of the State. He says they are still struggling in the dark on the development of their program. We discuss several points as follows:

1. More than one-half of the State is dry. The western part has fairly heavy rains but the rest has over 38,000 tanks for irrigation and other water needs. Some of these are more than 1,000 years old. During the last 50 years or so the villagers have not maintained the tanks so well as they did formerly. Many have broken spillways and many are silted. About half of them are out of repair. A series of tanks are built one after another along stream courses. On the Palar River alone there are 1,000 tanks. Thus the problem is not only to build more tanks but to repair and maintain them. He says their experts suggest deeper tanks to reduce losses by evaporation and losses of good arable land. But we agree they cannot be very deep else they will leak. (Added later: I find they know nothing of chemical sealers and I shall ask Dr. Raychaudhuri to look into this matter at once.) They plan grass strips around the tanks to serve as silt traps. They will use the silt in the old tanks for building higher bunds (really earth dams) and try to get good bunding on the catchment areas above the tanks.

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2. They need to improve their dryland practices because so far they haven't been able to increase crop yields much. Not much fertilizer is used except where there is irrigation because the rainfall is so uncertain, especially on the dark soils of the north. He agrees that the red soils would benefit from good bunding and hopes to have better laws within a year to promote it. He hopes to step up the training of soil conservation officers and shift the emphasis from irrigation to bunding. I agree except that I need to point out why the training must be good else the bunds won't hold. With good bunding I believe fertilizers will increase yields. This is highly important since these dryland holdings average scarcely 5 acres apiece.

The present law provides for the Department of Agriculture to maintain the bunds for two years. Both the Director and I agree that the law must be modified to provide that after 2 years the villagers should have responsibility to maintain them but that if any do not the Department should do it properly and charge all the cost against the holding, because a broken bund on one holding can ruin others.

3. Most irrigation canals from large streams are on the contour. The land above is not reached and there are dry pockets below. Some object to wells for these dry pockets but I agree that they should be tried and records kept of their water levels. I am convinced there is enough seepage to handle these pockets.

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4. On cooperatives, the Chief Secretary does not agree with the announced policies of Mr. Nehru and Mr. Dey. Mysore now has a few multiple-purpose cooperative societies, but most are for credit only. Usually shares cost Rs 10. Actually they have 5 sets of laws about cooperatives in the 5 districts that went to make up this State.

In the northern areas cultivators can get credit on crops but not on land if they owe anything; and most do because recently all debts were pooled against the land. Somehow he thinks these debts have got to be written off. Many of the cooperatives don't work well. Some of the successful ones are controlled by a few people who play the black market by giving favors to their friends and in other ways. He emphasizes what one can see from the road: the villages are not homogeneous either culturally or economically.

5. We discuss land ceilings. The landless laborers could be given wasteland that is potentially good. But they don't want this. They want to take land, preferably the best near their own houses, and thus they and the politicians keep things stirred up. He claims that they have little private land that is not reasonably well used. I give the usual arguments against low ceilings but he is apparently for "moderate" ones. "Moderate" was not clearly defined.

6. Northern areas were handled by old departments no longer existing. He says that many "large" farms of 15 acres could be irrigated now but the owners have not the money to develop it and

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under present regulations they can get only half the credit they need, which is almost worse than none. He hopes to change this policy but it won't be easy.

7. The government is now planting trees for fuel especially eucalyptus, acacia, and casuarinia. It has been a little hard to get the foresters interested in farm forestry in the villages but a little progress has been made recently.

8. He believes in price supports but he says it will take 2 or 3 years to develop a proper organization. Without this preparation a price-support scheme would fail miserably. He points out, for example, that paddy goes through several hands between the cultivator and the consumer. They would need local godowns and, above all, a local official able to judge paddy, honest, and able to resist the certain pressure of prominent villagers. The villages must be considered. In the old rationing scheme in Bombay State grains were collected from the villages by a quota system and distributed to the cities; but the villagers were left to shift as best they could. He thinks that the villages in South India are now better off than they were yet many people are inadequately fed.

I outline the scheme for price supports and storage explained earlier in these notes and the Chief Secretary thinks well of it <u>provided</u> it is a well prepared, long-time program with 2 or 3 years for organization, with local godowns, and with nationalization of the wholesale trade. Only this last can break the monopolies in the villages, he says. Without it the cultivator cannot escape the

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grasp that private traders and money lenders already have around him. (What he describes is the situation of many poor sharecroppers in the southern part of the United States.)

9. The Chief Secretary says that about 50 percent of the time of the village-level workers is spent on agriculture. Now the Department of Agriculture requires its junior staff to begin as village-level workers for 2 years. From these posts they will be promoted to block extension agriculturists and then to block administrators or to district agricultural posts. Both the Director and Chief Secretary say that this is the way to keep agriculture prominent. They both say that their government service lacks discipline all along the line. It is very difficult to remove bad village-level workers or any other poor employees. They have good laws but they are not enforced and there is much interference from politicians. Even cases of dishonesty are hard to bring to court. They now have established a new ruling that village-level workers cannot be posted in their home communities.

10. Neither has much information about social education officers. But the program is not amounting to much yet. They have great difficulty in filling these positions with people who can or will work with the villagers themselves.

11. Coordination is extremely difficult because of the lack of discipline in high places as well as low ones. Both feel that they are making real progress now through the committee of directors, which is headed by the Chief Secretary. But they have failures too.

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12. The Director says that his district officers generally prefer to work in the blocks. About 5 percent of the village-level workers are college graduates. Some 40 percent of the extension officers have had village experience. Many of the block officers are agricultural graduates.

The Chief Secretary says the blocks have done well on the whole except in social education. He emphasizes again to me that in any suggestions made by our team we must realize that results cannot be had at once. He criticizes the Delhi group for their ad hoc "campaigns," which cannot possibly succeed. He says that at least one-half of the funds in the recent Rabi campaign was wasted and he feels that the results of the special Kharif campaign may be disappointing.

This point of view is entirely reasonable. I am very much impressed with the Chief Secretary and with the Director of Agriculture. They obviously work well together.

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We pass a good unirrigated mango orchard, a Commonwealth laboratory for the biological control of insects in South Asia, and the new site for the Agricultural College now being built.

We stop at a tank where the Director shows how they intend to remove the silt, deepen it, plant grass margins, and control erosion on the catchment above. This is a good example of rill and gully erosion from badly planned highway ditches and weak and broken bunds.

From this tank they irrigate about 150 acres including table grapes (K-2750), potatoes, onions, and paddy. Some is now being transplanted.

The first tank we visit is in a small valley between gently sloping hills. The sloping red soils are poorly bunded, not on the contour. We see more irrigated paddy, vegetables, and grapes and the threshing of ragi from the dryland. We stop at one or two tanks to discuss this problem (K-2751).

They are pushing green manure trees here and we see several along the road that are said to be good ones - Pongamia pinnata (glabra). There is quite a bit of erosion here from overgrazing and badly planned highway ditches. We pass some government-owned land that is not used but could be with proper bunding. Part of this has been recently planted to trees.

We stop in Kodagurki village and watch the winnowing of ragi (K-2752). The bullocks have trampled the dry opened sheaves. The straw is lifted and shaken with forks. Then the seeds and chaff are swept up from the hard, cow-dung-painted threshing floor and

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K-2750. February 21, 1959. 6 miles north of Bangalore. New grapes.

K-2751. February 21, 1959. 8 miles north of Bangalore. Bad erosion on the red soil above tank caused by poor bunds and bad highway locations.

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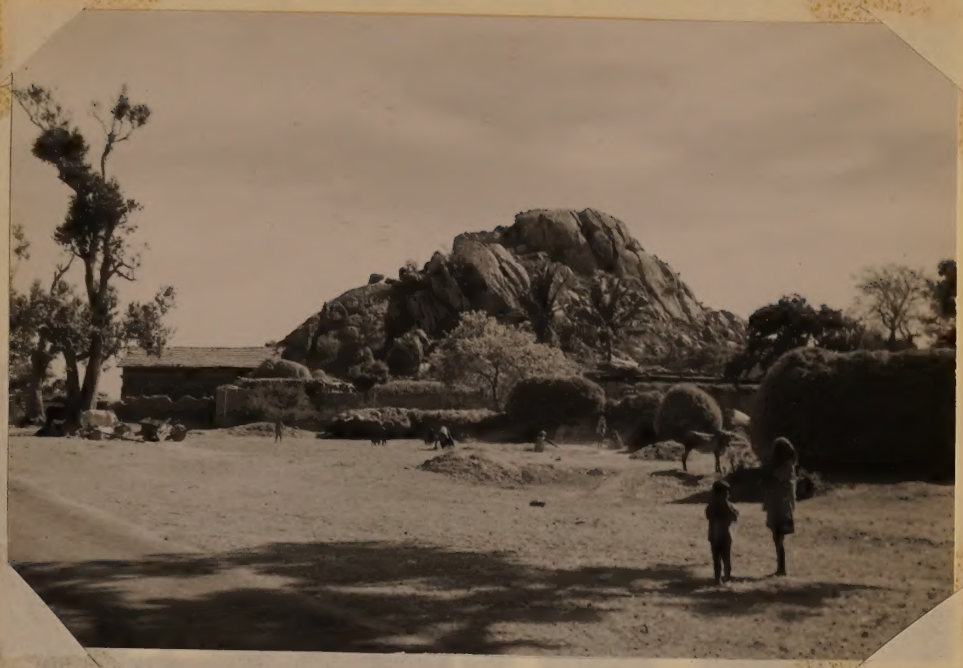

K-2752. February 21, 1959. About 21 miles north of Bangalore. Threshing ragi at Kodagurki Village.

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February 21, 1959. North of Bangalore. Threshed ragi grain.
Director M. M. Urs, C.E.K., P. V. R. Rao, and S. V. Govindanrajan.
(Photo by Dr. R.)

STANDING NEAR THRESHED RAGI GRAINS,
VILLAGE MUDAGUNKI, ON BANGALORE -
MADDI HILL ROAD, MYSORE STATE -
SHRI M.MALLARAJ URS,DR.C.R.KELLOGG,
SHRI P.V.R.RAO & DR.S.V.GOVINDA
RAJAN (21.2.1959)

21

February 21, 1959. North of Bangalore. Threshed ragi grain.
Director M. M. Urs, C.S.K., P. V. R. Rao, and S. V. Govindarajan.
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winnowed. They get dark brown seeds about the size of small radish seeds. The yield is about 600 to 800 pounds per acre and the grain sells for about one-fourth rupee per pound.

It is used in making bread and also cooked into a kind of paste. This is said to be very sticky and one rolls it into little pellets that are swallowed. It is a "poor man's" food of good nutritional quality.

From here we go on to stony, hilly land and climb to the top of Nandi Hill on a beautiful winding road. To insure moderate privacy visitors have to walk the last "furlong." (Indian, that is, actually about a half-mile.)

I meet Mr. Rebello, the division officer for five districts and join the conference of some 30 or more block officers from five districts.

The Chief Secretary tells them to go ahead with their agenda. They continue to discuss training camps for gram sahayaks. They hope to have 5 progressive farmers from each village. With this disposed of I can ask questions. I get some very interesting answers. But the trouble is that several answer at once and the block officers are both interrupted and interpreted by their superiors. But actually Mr. Rebello is an exceedingly able man and wants me to understand. He is the only one that speaks real good English.

The block officers say that bunding is going slowly, even though there is much interest, because the villagers expect a subsidy. The Chief Secretary says they should pay all the costs. But I support the block officers and say, "Why should the dryland farmer pay all

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the cost when other people using the tanks get much of the benefit?" The Chief Secretary says that that is right and they will try to get the regulations changed for a subsidy of around 25 percent!

I tell the block officers that it is hard for me to know just what a S.E.O. (Social Education Officer) actually does. "Could anybody tell me what one had done the last week?" Several reply but are interrupted before they can finish. One S,E.O. gets nearly through the week before he is shut off so I don't get one week for one man clearly but here are some of the replies: Organize training camps for the gram sahayaks. One S.E.O. worked in a village where only 18 boys out of more than 40 enrolled were attending the school. He had conferences with the parents and the teacher to try to increase interest in the school. One worked on a magazine for a group of blocks. One organized a young farmers' club to desilt a tank. Another demonstrated some new equipment. A cattle fair was organized. Savings clubs were encouraged.

One industry officer spent two days helping to improve the spinning of cotton. Improved wheels for pottery were introduced. Someone mentioned help to a cobblers' society.

I ask about joint farming. I gather that they don't expect much of it. It is explained that they have one joint farm developed on government land for 20 Harijan families that is 3 months old, and another that is 6 years old. This old one is said to be successful but the people want their own land. Mr. Rebello explains that they

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GRAM SAHAYAKS TRAINING CAMPS.

Gram Sahayaks camps in the Community Development Blocks were started in 1957. One of the main objects of these camps was to induce atleast 5 progressive farmers in every village to adopt all the improved practices in Agriculture on their lands. Circulars were issued requesting the Block Development Officers to organise one such Gramsahayaks camp in each of the Gramasevak circle, and also to see that the first round of such camps should be completed within October 1958. The experience gained so far may be summarised as follows:-

1. Many blocks have not yet completed the first round of Gram Sahayaks camps.
2. Many of these camps do not last even 3 days (We have been insisting that each of the camps should be conducted for atleast 3 days)
3. The Inauguration and valedictory functions are too formal in many cases, and ~~though~~ they take away most of the time, and energy of the block staff -- this does not leave much time for the other programme.
4. Sufficient attention has not been paid for organising demonstrations on all the improved agricultural practices suited to that area.
5. There are more lectures than discussions in the Gramsahayaks camps
6. Inspite of repeated requests no systematic record of the targets fixed for each progressive farmer in the camp has been maintained in many blocks. The Block Development Officers, were requested to open registers for each of the camp and to record the targets any improved agricultural practices accepted by each of the progressive farmer during the camp.
7. Systematic follow up of the Gram Sahayaks oriented in the camps has not been made in many cases.

Now that we are in the second year after the starting the Gram Sahayaks camps, the following programmes are suggested in continuation of the first round of Gramasahayaks camps.

1. In those circles where the Gram Sahayaks camps have already been organised, one camp may be organised in each village of the circle. In such cases the Village level worker with the assistance of the 5 oriented Gramsahayaks may organise atleast one day programme for another 20 to 25 farmers of that village. This programme is to consist of mainly demonstrations of the improved agricultural practices that could be taken up in that village, and also discuss on the adoption of improved agricultural practices in that village.
2. Starting the second round of Gramsahayaks camps in each of the Gramasevaks circle. In view of the importance attached to Agricultural production even this second round of camps has to emphasise agricultural production and is to include farmers other than the ones oriented in the first round of camps.
3. Organising a seminar of about 50 progressive farmers out of 500 who have undergone training in these camps during the last year. This seminar may be held for 2 to 3 days to discuss the various problems and to take decisions on how to adopt improved agricultural practices.
4. Specialised training of one week to two weeks can be organised for limited number of progressive farmers already oriented in the progressive farmers camps. These specialised programmes may be of the nature of intensive training in poultry farming, bee keeping etc.,

P.T.O

5. Organising study tours specially for the progressive farmers oriented in the camp.

6. Organising atleast one day refresher course just before the start of the monsoon season so that the progressive farmers already oriented in the Village leaders training camps may be given definite ideas of the improved agricultural practices they could follow during the next season.

7. Utilisation of the oriented progressive farmers in the Khariff campaign to be started intensively during the ensuing season.

---

want the land so that they can either sell it or mortgage it! He says that the Harijans are much better off than they were but they want to get still more money. A board of the villagers runs this farm through a secretary paid by the government. I ask how he can convince the Harijans that they are well off now? He throws up his hands.

I ask whether most fertilizers can be handled by the cooperative societies in the villages where they have irrigated lands. (Little is used on dry land.) Most block officers say that a society for one village has too little business but that some are working for several villages. One block officer says he has a good one for 15 villages. Some say that the cooperatives are fair with fertilizers but not so fair with iron and steel, which are in even shorter supply. Others say that the society directors and their friends get served first.

These notes cover only a little of what is said. Everybody is very friendly and direct. But several want to speak at the same time. On the whole I get a pretty good impression of their sincerity. Obviously they have a tough job.

We leave about 6:10 and drive back to the hotel rapidly between sundown and darkness. We go to dinner a little before 8:00, then notes, and to bed.

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North of Ootacamund at tea research station in Nilgiri Hills. Seated: S. Ananda Rau, L.J.K., C.E.K., S. V. Govindanrajan, and V. Jayaraman. (Photo by Dr. R.)

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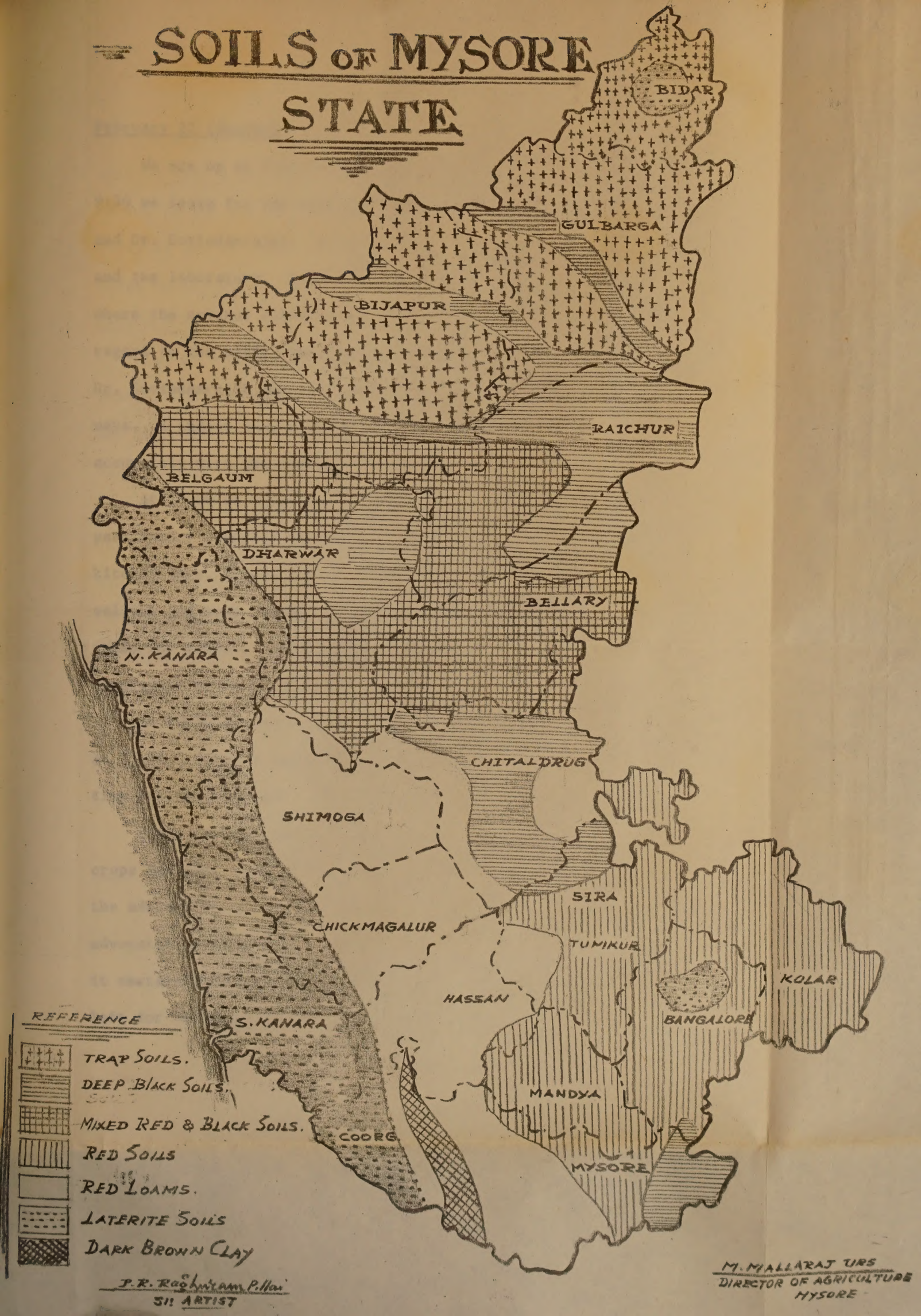
SOILS OF MYSORE STATE



P. R. Raghuram Pillai
SII ARTIST

M. MALLARAJ URS
DIRECTOR OF AGRICULTURE
MYSORE

February 22 (Sunday)

We are up at 7:00, breakfast, pack, and work on notes. At 9:30 we leave for the soil correlation laboratory with Dr. Raychaudhuri and Dr. Govindanrajan. I look briefly at the soil monoliths, the maps, and the laboratory. I am shown an interesting map from Kerala State where the revenue officers laid out farms for cultivators without any regard to the soil. Many of these farms fell wholly on rock outcrop! Dr. Govindanrajan wants to leave the field blocks off his manuscript maps. I insist they must be shown; otherwise they can't be used accurately with the individual holdings.

At 10:00 we leave in bright warm sunshine for the airport. We pass Sunday roadside markets with small vendors seated around fruits, kitchen ware, beads, and the like. There is probably some buying and selling and much gossip. We see women along the road digging out the grass for fodder. In an irrigated area people are cutting green fodder, apparently grown in rotation with paddy.

At 10:30 we check in for the flight to Delhi. We are in the air at 11:06. Since I logged this route a year ago we spend most of our time writing out these notes from the field notebook.

While passing over this great area that is mostly used for dryland crops and thus subject to famine in bad years, one can understand why the ancient religious leaders placed the cow in a high position and advocated no slaughter. This policy looks bad now but in those days it certainly prevented worse famine by having at least some cattle left for the planting of a new crop.

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February 23

Tea at 7:00 and to the office at 9:00. My reservations for tonight are only partly fixed. Mr. Dina Nath promises to see Dr. Basu and the others and have them to the hotel at 2:30. I return to work on notes and reports.

Between 6:15 and 6:35 p.m. I go to the main railway station in Old Delhi and board the train for Jodhpur at 6:45. My companions, Mr. Satyanarayana, Soil Correlator, and Mr. Subbiah, Deputy Director of Soil Conservation (engineering) come along about 7:15. I have my bed made up at once. This "air conditioned" compartment is less sumptious than the nice one I had last year. It may not be so good. The machinery is very noisy. The machine can be adjusted only with pliers! Certainly if I come to India again I shall bring pliers and a screwdriver.

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Bhāwi
Nimāj
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Sojat Road
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Alāi
NĀGAUR
SĪKAR
Dīdwāna
Ringus
Thāna Ghāzi
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Pokaran
Kuchera
Makrāna
Degāna
SĀMBHAR LAKE
Parbatsar
Sāmbhar
Partābgarh
Mahwah
Wer
Devikot
Osiān
Āsop
Merta Rd
Merta
Rūpnagar
JAIPUR
Phulera
Mozamābād
Daosa
Bayāna
Hindaun
Bānsrai
Umed
Mavānia
Pushkar
KISHANGARH
Chāksu
Phāgi
Lālsot
Karauli
Gangāpur
Bisu
JODHPUR
Pipār
AJMER
1593
Nasīrābād
Diggi
Bāonli
Kelān Devi
Sir-Mottra
Shergarh
Sheo
Bhīsra
Bhāwi
Nimāj
Beāwar
Mālpura
Toda Rai Singh
TONK
Silīpur
Patodi
Kalānpur
Pachpadra
Jasol
Sojat
Sojat Road
Todgarh
Bārl
SAWAI MADHOPUR
BARMER
PALI
Siwāna
Sindari
Marwar
Sareri
Shāhpura
Deoli
Nainwa
Indargarh
Lakheri
Burdā
Motīsarai Bera
Dewari
Deogarh
Mānda
Sheopur
JĀLOR
Garbor Road
Rāni
BHILWĀRA
Bīgod
BŪNDI
Etāwah
Baroda
Pauri
Erinpura
Sādri
Potla
KOTA
LŪNI
SUKRI
CHAMBAL
BANĀS
WESTERN RAILWAY
NORTHERN RAILWAY
A R A V A L L I
S H E K H A W A T I

February 24

Although I awaken at 4:00 a.m., I soon go back to sleep until 6:00 a.m. I have a banana and at 7:00 tea is brought. Now I realize that I forgot to check my film numbers so start to guess what they were. Probably I shall need to renumber those of the next 4 days.

The train is now passing over very dry, rather sandy soil with a few low stabilized dunes. The cover is closely grazed short grass with some clumps of a tall bunch grass, low spiny shrubs, and almost ghost-like heavily pruned trees that resembel mesquite. I take it that these branches are cut for fodder. (Added later: In the afternoon I am told that the main tree is "khejri" (Prosopis specigera), for fodder and fuel. (K-2753) More important is the shrub, "ber" (Zizyphus numuclaria), which bears an edible fruit, gives good fodder, and serves for fuel and fencing. The dried branches are shaken and the leaves collected as fodder.) Here the trees have a bit wider spacing than orchard plantings. Cattle are grazing. I see a few outlying mesas of stratified rock some 100 to 150 feet high. These are probably sandstone.

At 7:45 we stop at Khatu, some 20 miles east of Degana.

As we go on I see a few low brown stacks, which I presume to be emergency feed harvested locally. (K-2754) Some are protected with spiny bushes. Besides low dunes, there appear to be some man-made ridges or bunds some 3 to 4 feet high and 20 feet wide, capped with dead spiny bushes. These serve as fences, for runoff control, and to break the wind. Some are straight, others curving. Some low,

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K-2753. February 24, 1959. About 7 miles east of Degana. Grazing area with heavily lopped browse trees.

K-2754. February 24, 1959. About 3 miles east of Degana. Fallow and grazing.

K-2753. February 24, 1959. About 7 miles east of Degana. Grazing area with heavily lopped browse trees.

K-2754. February 24, 1959. About 3 miles east of Degana. Fallow and grazing.

smooth areas have been sown to some fodder, probably bajra and jowar of the last Kharif season. I see scattered homes in low flat areas surrounded by these brush-covered bunds. The few people about have their heads and necks well protected by shawls.

We stop at Degana about 8:20. I order breakfast but it comes as only tea and toast just as we leave at 8:35. It is said that this area was more flourishing in ancient times. Subbiah speaks of a "man-made desert." Of course overgrazing is an important factor but I believe climatic change to have been more important. (K-2755) Then too, the many stabilized low dunes, with only a few blowouts, suggest an earlier period drier than now not very long ago.

As we go on I see many nearly level fields for dryland crops separated by north-and-south bunds capped with dead, spiny bushes. I see cattle grazing.

I take several pictures of homesteads and of the landscapes. (K-2756; K-2757; K-2758; K-2759) Here and there I see a very few tiny plots irrigated from wells. Quite a bit of land has had a harvested Kharif crop.

We stop at Merta Road Junction. (K-2760) I notice one station door with a sign indicating a place for victims of heat stroke! But now the temperature is perfect. For some distance beyond this stop I should say that about one-third of the soil is undulating (K-2761) and, in places a bit shallow and cobbly. It probably belongs to the Reddish Brown soil group. I see small mesas or buttes some 300 to 500 feet high to the south as we go up a slow grade.

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K-2755. February 24, 1959. About 10 miles west of Degana. Heavily grazed cropped soil and heavily lopped browse trees.

K-2756. February 24, 1959. About 12 miles west of Degana. Threshing area.

K-2755. February 24, 1959. About 10 miles west of Dayana. Heavily grazed cropped soil and heavily lopped browse trees.

K-2756. February 24, 1959. About 12 miles west of Dayana. Threshing area.

K-2757. February 24, 1959. About 17 miles west of Degana. Grazing cattle and goats.

K-2758. February 24, 1959. About 20 miles west of Degana. Homestead. Fodder stacks and heavily lopped browse trees.

K-2757. February 24, 1959. About 17 miles west of Degana. Grazing cattle and goats.

K-2758. February 24, 1959. About 20 miles west of Degana. Homestead. Fodder stacks and heavily lopped browse trees.

K-2759. February 24, 1959. About 3 miles east of Merta Road Junction. Landscape - some Kharif crops.

K-2760. February 24, 1959. Merta Road Junction. People in the station.

K-2759. February 24, 1959. About 3 miles east of Merta Road Junction. Landscape - some Kharif crops.

K-2760. February 24, 1959. Merta Road Junction. People in the station.

K-2761. February 24, 1959. About 4 miles west of Merta Road Junction. Landscape.

K-2762. February 24, 1959. About 7 miles west of Merta Road Junction. Landscape - grazing and old Kharif field.

K-2761. February 24, 1959. About 4 miles west of Merta Road Junction. Landscape.

K-2762. February 24, 1959. About 7 miles west of Merta Road Junction. Landscape - grazing and old Kharif field.

Then again we go by smooth soil of which about one-half is used for dryland crops. (K-2762; K-2763; K-2764) Some fields are now fallow and a very few are being "plowed."

We stop at Gotan, where there is a lime factory.

We go on over what appears to be undulating Reddish Brown soil. A few fields have a Rabi season crop of gram. In places I see many partially stabilized dunes. Gradually the cropland is less except for the small areas between the old low dunes.

We stop at Pipar Road Junction. Now it is comfortably warm and sunny. Subbiah says that rains were good last season and crops better than average. (Added later: At the Station in Jodhpur, they tell me less than average!) There are many sheep, goats, and cattle, including buffalo - I fear too many for the forage available to them.

While we wait here for a train coming east, my porter becomes very conversational. He wants me to bring him an Omega watch when I come to India next year!

The soil in places resembles Sierozem, probably because of limy parent material. Certainly there is a prominent lime horizon. We pass an old playa a mile or so wide with somewhat heavier soil. A small part is irrigated from wells. The higher undulating soil beyond looks to be Reddish Brown.

As we come into Jodhpur I see the great palace of the Maharajah to the south and the ruins of an old fortress within the city just north of the railway station. We arrive at 12:22 p.m., only 22 minutes late.

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As we come into Jodhpur I see the great palace of the Maharajah to the south and the ruins of an old fortress within the city just north of the railway station. We arrive at 12:22 p.m., only 22 minutes late.

K-2763. February 24, 1959. About 10 miles west of Merta Road Junction. Landscape.

K-2764. February 24, 1959. About 19 miles west of Merta Road Junction. Homestead.

K-2763. February 24, 1959. About 10 miles west of Merta Road Junction. Landscape.

K-2764. February 24, 1959. About 19 miles west of Merta Road Junction. Homestead.

We are met by several people, including:

Mr. P. M. Dabadgao, Agrostologist, DASC (Desert Afforestation and Soil Conservation Station.)

Mr. R. N. Kaul, Silviculturist, DASC

Mr. D. K. Misra, Agronomist, DASC

Mr. W. R. Pandit, Administrative Officer, DASC

Dr. R. B. Singh, Soil Conservation Officer

Mr. S. P. Seth, Assistant soil chemist, soil testing

Mr. A. S. Neg, District Agricultural Officer

Mr. D. P. Mathur, Block Development Officer

As we leave for the Circuit House, I notice several beggars in the station. It is quite warm, dry, and very sunny. I am told that Jodhpur has a population of about 2 lakhs. The rainfall is 13 inches, mainly from July to October.

I'm given a large room with 2 baths, a dressing room, and a sitting room. I shave and change. At 1:15 I have lunch here, along with Professor and Mrs. Calvin W. Stillman of the University of Chicago.

My many guides come at 2:30 and we drive through the city to the farm of the Desert Afforestation and Soil Conservation Station. It still seems curious to see a cow lying in front of a jewelry store in the heart of the city and just peacefully chewing her cud. I see several camels heavily loaded with roots and stumps for firewood and others with enormous bags of fodder.

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This is a new farm of 162 acres and research projects have been going here only for a year or so. Besides this station they have units (or substations) and several grassland management demonstrations, especially of range guarding, throughout the dry part of the State. In the western part, the rainfall is said to fall to about 2½ to 4 inches.

I look hurriedly here at the soil - a Regosol tending toward Reddish Brown - from fine cover sands. The relief is very gently undulating to level.

A_1	0 - 15"	Reddish brown (5YR 4/4) light loamy fine sand. Nearly structureless. Digs out in clods that are easily friable to single grain. Indistinct lower boundary.
A_3	15 - 33"	Transitional
C	23 - 80+"	Brown (10YR 5/3) very light loamy fine sand to fine sand. Structureless. Digs out in firm, easily friable clods that go to single grain.

Here I photograph the guarded and unguarded grassland. (K-2765 and K-2766) Two seasons has made a large difference. Then I look briefly at a few experiments:

1. Tree and grass nurseries with several species. The native grasses, on the whole, do well with reasonable treatment. They have also some promising legumes.

2. Fertilizer experiments on grasses and dryland crops. (I would not expect much, except from light nitrogen and phosphorus).

3. Reseeding and grazing.

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K-2765. February 24, 1959. Jodhpur.
Unguarded grassland near the Desert Afforestation and Soil Conservation Station.

K-2766. February 24, 1959. Jodhpur.
Grassland guarded for two seasons adjacent to K-2765. The grass in seed is said to be Dactyloctenium scindicum.

K-2765. February 24, 1959. Jodhpur.
Ungrazed grassland near the Desert Afforestation and Soil Conservation Station.

K-2766. February 24, 1959. Jodhpur.
Grassland grazed for two seasons adjacent to K-2765. The grass in seed is said to be Dactyloctenium scindicum.

4. Stubble of bajra left at different heights and sand blowing measured by placing a metal cylinder about 2 feet high and one foot in diameter, with one-inch holes, over a funnel some 12 inches above the ground, to collect the sand that blows.

5. New crops that appear promising are pigeon peas and castor beans.

6. The farmers have long used bajra in mixtures with various legumes. Several kinds of legumes at different rates of seeding are being tested. (Along the field roads I see low flat mounds about 18 inches high of cow dung covered with clay and sand for curing!)

7. Grass strips for soil-blowing control.

8. Plantings of eucalyptus and acacia from other countries to get a fast-growing, drought-resistant tree for fuel.

Then we leave the station and go west toward rugged sandstone hills - remnants of old mesas. We pass a large sandstone quarry. Except for these rocky hills the land is undulating. The chief plants are the fodder trees and shrubs already mentioned and a little grass.

We pass a tank, now nearly empty, used to store water. The soil pattern becomes very irregular with small fields developed from sandy materials of alluvial and colluvial origin, leveled and irrigated, mainly from wells.

We stop near the village of Chankha and interview a farmer with 30 acres of sloping leveled soil in small, bunded irrigated fields.

(K-2767)

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We stop near the village of Chankha and interview a farmer with 30 acres of sloping leveled soil in small, bunded irrigated fields.

K-2767. February 24, 1959. A few miles west of Jodhpur. Field, leveled for irrigation.

K-2768. February 24, 1959. A few miles west of Jodhpur. Well with two Persian wheels.

K-2767. February 24, 1959. A few miles west of Jodhpur. Field, leveled for irrigation.

K-2765. February 24, 1959. A few miles west of Jodhpur. Well with two Persian wheels.

February 25, 1959. On farm near Chankha.
(Photo by Satyanarayana)

February 25, 1959. On farm near Ghandia.
(Photo by Satyanarayana)

His crops include:

Wheat, 2½ acres; yields about 12½ maunds per acre.

Cauliflower, ½ acre

Lucerne, 3½ acres

Sweetpotatoes, 1½ acres

Lemons, ½ acre

Figs on several field boundaries

Carrots, 1 acre

Tomato, 1½ acres

Commercial flowers, small acreage.

The remainder appears to be fodder crops, probably bajra in fields not yet completely in shape for irrigation or else water is lacking. He applies cow dung at roughly 25 maunds per acre. He seeds 50 pounds per acre of wheat. He irrigates this once each week for 10 weeks or so.

He owns this farm without debt. He has 6 children of whom 2 are in school. Obviously the gram sevak and block officers have picked him out. The block is only one year old and I doubt they have helped him much although they say they have helped with better seeds.

For irrigation he has two Persian wheels,[1/] operated by bullocks, on one well (K-2768). There are only 10 inches of rain. The small irrigation canals are made of red sandstone slabs some 6 to 10 feet long setting on high, nearly vertical terrace faces that need continual

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1/ Added later: Some of the Indian irrigation engineers insist these are not true Persian wheels but wheels of a design indigenous to India.

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Tomato, 1½ acres

Commercial flowers, small acreage.

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For irrigation he has two Persian wheels,[1] operated by bullocks, on one well (K-2768). There are only 10 inches of rain. The small irrigation canals are made of red sandstone slabs some 6 to 10 feet long setting on high, nearly vertical terrace faces that need continual

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repair because of the very sandy soil. The benches are 2 to 4 feet high and the fields between leveled. I notice that the tomatoes appear to be diseased.

Then I am taken for tea, with garlands! Near me is a large pile of the ber leaves from an improved, grafted variety, which, if protected from animals, grows into a small tree.

The block officer says they have honest, multiple-purpose cooperatives that work well. One share costs Rs 10 and no one can have more than 10 shares. He says that there is little interest in joint farming except for one of 1,000 acres for 17 or 18 families at Jajiwalkalan village. The gram sevak seems fairly good. He says most children get schooling.

We drive northwest into a complex of rocky hills and small irregular alluvial valleys, bunded, leveled, and irrigated for wheat and other crops. We pass some hilly areas that have been guarded by fences for ½, 1, 2, and 4 years. The return of forage and browse plants is remarkable.

The fence is made of wire and sandstone slabs for posts some 7 to 9 feet high, set in concrete. (K-2769) Barbed wire passes through holes in the slabs. The cost is one rupee per running foot.

This thin rocky soil from red sandstone is a lithosolic Reddish Brown with a distinct lime horizon where the soil is more than a foot deep. We cross a long narrow reservoir within these hills. It is said that water is taken, with boosting stations, from 60 miles

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K-2769. February 24, 1959. Northwest of Jodhpur. Fencing on rocky land with local sandstone slabs set in concrete. (Cost is one rupee per running foot.)

K-2770. February 24, 1959. Palace of the local Maharajah.

away and now they are going up to 100 miles since the city is short of water. Here the tops of the hills are 80 percent rock outcrop. We return to the plain by the same quarry we passed earlier and into the city.

Then they take me to the palace of the Maharajah of Jodhpur, a boy of 12 years, now studying in England. It is a huge sandstone affair, recently built. (K-2770) My guides are determined to show me every room; but I am also determined and break it off. The place is expensive and luxurious, but not to my taste.

On the way back to the Circuit House, I stop for a moment in the local emporium. I am back at 6:30, wash, and hope to rest a bit. But my guides come to talk. They tell me that a shepherd with little or no land can begin with a few sheep and goats, let the flock grow, and graze it across all the land, private and public. Thus the land is terribly overgrazed.

After dinner I chat a bit with the Stillmans and work on my notes. Nearby someone is beating a drum. I believe all the many dogs of Jodhpur are barking outside my door! To bed at 10:45 while the dogs still bark.

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February 25

I am up at 6:30 for a combined tea and breakfast. After awhile on notes I leave at 8:00 a.m. for a (State) government experimental farm called the Mandor Farm. It is about 5 miles north of Jodhpur. Certainly this town has many dogs for its size. It is slightly cool and sunny. Considerable fence here consists of red sandstone slabs about 8 to 10 feet long set tightly together. (K-2773)

I am told that in this region about one-third of the area has nearly barren rocky land, some in low mountains, and about two-thirds is very sandy soil.

We meet Mr. Jodh Singh, Deputy Director of Agriculture, and the local manager. They have 119 acres of which 51 are irrigated.

Wheat (RS 31.1)	25 acres at 12 maunds per acre in 1955-56; 11.5 in 1956-57; and 21 in 1957-58.
Barley RJS 19)	4 acres at 17 maunds per acre
Zera (or cumin)	2 acres
Lucerne	1 acre

Fruits, mainly pomegranate and guava,11.2 acres

They show me the following experiments:

1. Wheat variety trials

2. Weed control

3. Trace nutrients (Iron gives response, they say, on wheat, and zinc on fruits.

February 25

I am up at 6:30 for a combined tea and breakfast. After awhile on notes I leave at 8:00 a.m. for a (State) government experimental farm called the Mandor Farm. It is about 5 miles north of Jodhpur. Certainly this town has many dogs for its size. It is slightly cool and sunny. Considerable fence here consists of red sandstone slabs about 8 to 10 feet long set tightly together. (K-2773)

I am told that in this region about one-third of the area has nearly barren rocky land, some in low mountains, and about two-thirds is very sandy soil.

We meet Mr. Jodh Singh, Deputy Director of Agriculture, and the local manager. They have 119 acres of which 51 are irrigated.

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K-2773. February 25, 1959. Mandor Farm near Jodhpur. Common type of fence from slabs of sandstone. The slabs are about 12 inches wide and 10 feet long. They are set into the ground about 2 feet. Each slab costs about one-fourth rupee.

K-2173. February 25, 1959. Mandor Farm near Jodhpur. Common type of fence from slabs of sandstone. The slabs are about 12 inches wide and 10 feet long. They are set into the ground about 2 feet. Each slab costs about one-fourth rupee.

4. Fertilizer trials (ammonium sulphate, urea, ammonium sulphate nitrate, bone meal, and superphosphate at different rates and a few combinations). They say that bone meal gives better results than superphosphate. I do not see why in a soil of pH 7.5.

5. Rates of seeding. I see several crosses of American and Indian wheats. In these trials they seed at 82 pounds per acre "because the farmers do although we know it is too high." They irrigate 7 times in a season. I ask when; and the reply is, "When the leaves begin to wilt." No soil moisture measurements have been made. I'm told that one plot yields 50 maunds per acre. But it seems to me that the soil is quite variable from past treatment and that the irrigation is very uneven. I'm told that there is a kankar layer just above gravel at 4 feet, but the soils here have not been examined!

I see some typical implements, including a little-used small moldboard plow and a "manure mixer" (K-2772). I note that weeds are a problem and that some are being removed by hand. The pomegranates need pruning. This station has fruit but no horticulturist.

They have three wells for irrigation. Two have electric motors for pumping from about 64 feet; the third has 2 Persian wheels. I am amazed that the ridges of this loamy sand, which support the small canals, hold up as well as they do. What little clay there is in it must be highly active.

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K-2771. February 25, 1959. Mandor Farm near Jodhpur. Irrigation canal, with diversion.

K-2772. February 25, 1959. Mandor Farm near Jodhpur. A "manure mixer" - a tillage implement for working manure and seeds of green manure crop - guar - into the surface soil.

K-2771. February 25, 1959. Mandor Farm near Jodhpur.
Irrigation canal, with diversion.

K-2772. February 25, 1959. Mandor Farm near Jodhpur.
A "manure mixer" - a tillage implement for
working manure and seeds of green manure crop -
guar - into the surface soil.

The pomegranates on the trees are wrapped individually with large leaves from trees, held together with thorns to protect them from the birds. It is said that a maharajah introduced these fruits from Afghanistan about 300 years ago.

They have here some improved "ber", which grows to a small tree with larger leaves and fruits than the wild sort.

I look at the well with 2 Persian wheels operated by bullocks. (K-2774; K-2775) It is 110 feet deep. (Tube wells are said to cost Rs 34 per foot so with cheap local labor dug wells are cheaper). They say they get 3,000 gallons per hour with both wheels going. The wheels run now 24 hours per day. One team works every other 2-hour shift for about 12 hours. Each bullock costs Rs 500 on the average and it takes about Rs 50 per month to maintain him. So the water from such a deep well is too expensive for practical farming. They expect to install a new electrically driven pump soon.

I look at some fertilizer plots. Of course, phosphate alone does very little. But the variations of soil and of irrigation are bound to lead to poor results.

Then we must sit for a while and have pomegranates, guava, and ber fruits. Now by 10:00 a.m. it is hot.

We drive back by way of the Mandor Gardens - a public park with nice gardens, cenotaphs, and many painted statues of old heroes. (K-2776) I am back in the Circuit House for lunch at 11:00.

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K-2774. February 25, 1959. Mandor Farm near Jodhpur. Well with two Persian wheels.

K-2775. February 25, 1959. Mandor Farm near Jodhpur. Another view of well with two Persian wheels.

February 25, 1959. Near Jodhpur
(Photo by Satyanarayana)

February 25, 1959. Near Jodhpur
(Photo by Satyanarayana)

K-2776. February 25, 1959. Mandor Farm near Jodhpur. A group of cenotaphs in Mandor Garden.

At 12:05 p.m. we leave for Ajmer by way of Pali. We go out on a gently undulating plain of fine sandy soil with a few old low dunes. Many goats, cattle, and sheep graze the uneven land and a part of the smooth areas. Only a part of the smooth soil has had a Kharif crop. The pasture is very thin grass, spiny bushes, and trees. I see some bajra fields and a few of irrigated wheat. I'm told that bajra here yields only 40 pounds or so per acre. The soil is "plowed" once and the seed is broadcast.

At 10 miles most of the soil is cultivated.

I see a poor crop of mustard. This area is well on the boundary between the "sown" and the "unsown", without irrigation.

Then in a mile or two the soil becomes a bit more clayey. I stop briefly to look at the Reddish Brown soil from loamy cover sand over sandy loam shallow above kankar. ("Kankar" is the local word for consolidated or partially consolidated horizons of lime accumulation, usually as nodular calcium carbonate.) I see a few low dunes with blowouts.

Here runoff water is collected in stone-covered tanks, called "tanka", to prevent losses by evaporation. I see one about 15 feet by 25 feet and 8 to 10 feet deep, half full of water. Nearby I see camels that carry water away in large leather bags on either side.

Beyond, the soils are a bit heavier and have kankar hardpan. There are a few rocky hills. I see some fields for Kharif crops in the lower places with surface soil partly of cover sands. The overgrazing is severe, especially near the villages.

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About 18 miles out of Jodhpur I see some irrigated wheat. We cross the dry bed of a fork of the Luni River. Lands that can only be grazed are called "bir." People may not cut the trees for fuel, only small branches for fodder.

The young trees planted along the road by the DASC are really having a struggle against the drought, kankar, and animals. But they may come. Some are doing quite well. In the worst shallow (over kankar) places, shrubs are planted instead of trees.

Some areas along here are in the process of being taken over by the government from large landlords. Since neither controls them at the moment, some are using the "bir" for illicit cultivation of Kharif crops and for illicit grazing, especially by nomadic, landless cattle herdsmen who sell ghee.

I stop for a picture of this overgrazed bir. (K-2777) The soil has a loam A_1 over kankar at 12 to 30 inches. It is a shallow Reddish Brown soil I should say.

After 24 miles I see a few more fields of wheat irrigated from charas wells, especially wells at the margin of sandy river beds. This is lifted to a high canal for fields some 150 yards away of sandy loam soil. There are also some dryland fields used only in the Kharif season, but most of the land is very heavily grazed with scrubby, scattered trees and very little grass.

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K-2777. February 25, 1959. 24 miles south of Jodhpur. Overgrazing on Reddish-Brown soil, with kankar at 12 to 20 inches.

K-2778. February 25, 1959. 41 miles south of Jodhpur. About 3 years of guarding the range on clayey, shallow soil over kankar has had a remarkable effect.

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Then 29 miles south of Jodhpur the relief is more dune-like. The cover has even less grass in it but more shrubs and trees. Then I see some wheat, irrigated partly from wells and partly by a canal from a tank. Then again the poor bir with a few rocky hills.

At 31 miles out there are a few dunes and dry-farming fields used in the Kharif season in the low places with cover sands. Even now a bit of sand blows.

I stop to photograph one of the many camps of nomadic people who work on roads. They have very little baggage. They have donkeys to carry earth on their jobs.

As we go on, I see the odd field of irrigated wheat and of last year's Kharif crop, probably bajra.

At 37 miles I look hastily at the soil in an old playa:

A_1	0 - 12"	Grayish-brown (10YR 5/2) heavy fine sandy loam. Fairly hard when dry. Massive with some vertical breakage.
A_{3ca}	12 - 30"	(Varies from 25 to 40) Slightly lighter colored fine sandy clay loam with gray mottles of calcium carbonate.
C	30 - 48+"	Mottled gray, yellowish gray, and nearly white, massive fine sandy clay loam that breaks out in laminated angular fragments.

Where such materials have a few inches of the cover sand on top they are more nearly suitable for crops.

We cross the railway and see a higher proportion of dry (Kharif) farming on smooth sandy soils.

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At 41 miles south of Jodhpur we stop at a substation of the Desert Afforestation and Soil Conservation Station. Here is a nursery for trees and 28 acres for grass seed multiplication. They tried wheat and gram without irrigation but the plantings failed. Some 900 acres are under protection for natural regeneration and tree plantings.

I look hurriedly at the soil here in this nearly level plain. It seems to have been an old strath terrace covered to various depths with alluvium.

A_1	0 - 10"	(Variable gradual lower boundary) Dark brown (10YR 3/3) gritty clay loam. Firm but digs out in clods that are fairly friable to mixed fine granular and small irregular blocky.
B - C_{ca}	10 - 20"	(Very variable in depth and thickness) Light brownish-gray, partially consolidated kankar. Pervious.
C	30 - 40+"	Calcareous subangular gravels mixed with clay and some lime concretions. Variable thickness. Reasonably permeable.
D	40 - 50+"	(This may come at 20 to 50 inches) Variable rotten rock that seems to be chert and impure limestone.

The success of the individual trees depends on the depth of the A_1 and the hardness of the kankar at the spot. With guarding here considerable grass of the best local species is slowly coming in. (K-2778)

We come into Pali about 2:40 p.m. Here near the margin of the town, the road is on a high grade that serves as a tank bund. Now the water is quite low. But during the monsoon a wide area is covered with water. Now this area has wheat - rather poor - under what is called "tank-bed" cultivation.

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We make an unscheduled stop at the office of the district agricultural officer, Mr. C. S. Bhatnager. Again it is clear that these boys have no concept of time and distance. It is claimed here that 60 percent of the block funds are used for agriculture, including minor irrigation. He claims that last year they had a 7 to 8 percent increase in production, including for this district: wheat, gram, barley, and mustard as Rabi crops, and jowar, bajra, maize, and cotton in the Kharif season.

We leave at 3:00 p.m. with 101 miles yet to go. Here and there I see irrigated wheat. Near this town mesquite is becoming a bad nuisance. The rain here is higher, perhaps up to 16 inches, and we pass several fallow fields of the Kharif season, including some that were in cotton. The plowing is done without tearing up the trees and large bushes. Some fields seem not to be used every year. On the whole not a very great percentage of the surface is cultivated. The shallow soils over kankar are not plowed but are extremely heavily grazed. The ground is mostly bare.

I stop twice to photograph a characteristic combined bund, fence, and partial windbreak. (K-2779; K-2968) On the outside, a ditch is made some 2½ to 3 feet high to have earth for the bund. Then they place thorny and spiny branches of mesquite and ber against it and on top.

Wheat is being irrigated here from a well. Some bad areas here are improved by spreading silt from the tanks to give a deeper surface soil.

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Wheat is being irrigated here from a well. Some bad areas here are improved by spreading silt from the tanks to give a deeper surface soil.

K-2779. February 25, 1959. 95 miles west of Ajmer. Characteristic fence and bund. Mainly branches of mesquite and ber are used.

K-2179. February 25, 1959. 95 miles west of Amer.
Characteristic fence and bund. Mainly branches
of mesquite and ber are used.

K-2968. February 25, 1959. 90 miles west of Ajmer.
Typical thorn bush fences.

K-2908. February 25, 1959. 90 miles west of Ajmer.
Typical thorn bush fences.

Most of this area looks dry and overgrazed now. I can scarcely imagine what it will be in June just before the rains come. Still the cover on the whole gradually improves as we go east. Since leaving Pali the plain has been nearly level. At 85 miles west of Ajmer are more patches of irrigated wheat and I see a very short gram being harvested and one small patch of irrigated cotton. There are many stubble fields from the Kharif crops and many cattle.

At milestone 81 from Ajmar I stop to look at a very interesting Persian wheel, operating from a well about 50 to 60 feet deep, being used to irrigate wheat. (K-2969) Except for 2 small shafts of iron all of the mechanism is home-made from local materials, including huge coarse, wooden gears, and home-made rope to which locally made ceramic pots are fastened. These little pots hold about 2 quarts and each has a little hole in the bottom so that when its turn comes to be filled the air can escape. The leakage is not great since for most of the way each one leaks into the one below.

I talk briefly with the farmer who says he will get 8 to 10 maunds per acre of wheat on the 10 acres he irrigates from this well. (K-2780). He applies water five times. He has 22 other acres for bajra in the Kharif season and for grazing. Twelve people live on this farm as a joint family. He has a boy of about 11 helping him as an outside laborer, who does not go to school. This farmer doesn't like commercial fertilizer and thinks that cow manure is much better. He doesn't know about the gram sevak and belongs to no cooperative. Yet certainly he is a better-than-average farmer with fairly good sandy loam soil.

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I talk briefly with the farmer who says he will get 8 to 10 maunds per acre of wheat on the 10 acres he irrigates from this well. (K-2780). He applies water five times. He has 22 other acres for bajra in the Kharif season and for grazing. Twelve people live on this farm as a joint family. He has a boy of about 11 helping him as an outside laborer, who does not go to school. This farmer doesn't like commercial fertilizer and thinks that cow manure is much better. He doesn't know about the gram sevak and belongs to no cooperative. Yet certainly he is a better-than-average farmer with fairly good sandy loam soil.

K-2969. February 25, 1959. 81 miles west of Ajmer. Persian wheel with ceramic pots for a 50- to 60-foot well for irrigation.

K-2780. February 25, 1959. 81 miles west of Ajmer. Irrigation canal from Persian wheel to wheat field.

We drive on to Sojar, where there is a block office, and my guides insist on having tea at 4:10 p.m. Sometimes I think these folks are plain lazy. I meet the revenue officer but no agriculturist.

I see a big man with a huge turban and silver-headed cane and get him in conversation. He has somewhat over 80 acres of land including 12 acres of wheat irrigated by a Persian wheel and, during the Kharif season, 40 acres of jowar and 30 acres of bajra. Now he has 4 permanent workers but in the busy season he has 30 to 40 temporary workers. From his well he can take water only during the day. He has used ammonium sulphate but he thinks it makes his soil more salty. Like many here, the flat soil without cover sand tends to be salty and so does the well water. He says there is no cooperative society for this area.

We leave at 4:30. Gradually the soil is becoming a trifle more reddish. We cross the dry bed of the Sudki River and see the same general pattern of soil use: some irrigated wheat that is rather poor, dryland fields, and overgrazed shrubby range.

About 72 miles west of Ajmer we cross another dry river bed. Here the soil is essentially barren except for a few scrubby trees. All these dry river beds are bordered by low dunes on the east side, mostly stabilized. Here the belt is nearly a mile wide and then we pass to nearly flat Reddish Brown loam soils used mainly for Kharif crops. As elsewhere, the common land near the village is nearly barren and windswept.

At the 68 milestone we cross another dry stream bed with the low dunes along its eastern margin.

The village women are very colorful. They have long and abundant clothing with strong colors, especially reds and orange-yellows. Most have ankle bracelets, scarves, and many ornaments. They often cover or partly cover their faces.

As we go on much of the soil is used for crops including a small percentage of irrigated wheat. Many of the fields have bunds, that is field bunds on the margins, not proper contour bunds; some are not well maintained. With a high percentage of cropping, the overgrazing is simply terrible, especially near the villages. The camels have an advantage: they can reach high for the branches of the scrubby trees. Beyond milestone 60 the soils are a bit deeper sandy loam. (K-2781)

Now we are seeing besides wheat some chilies and castor beans near the wells.

At milestone 49 we come into rolling and hilly rocky soil with only a few small fields of soil from alluvium. These are mostly irrigated. At milestone 37 we are out again on very gently sloping Reddish Brown soil used mostly for crops but only a small percentage is irrigated from wells.

We drive through Beawar at 6:00 p.m., one hour behind schedule with 33 miles to go. This is a market town with some cotton mills.

K-2781. February 25, 1959. 57 miles west of Ajmer. Grazing sheep and goats after Kharif crop of bajra on sandy loam of Reddish-Brown soil group.

K-2181. February 25, 1959. 57 miles west of Amman. Grazing sheep and goats after Kharif crop of barley on sandy loam of Reddish-Brown soil group.

The soil continues about the same with more hills and overgrazed wasteland and more irrigated cereal, both at the expense of dryland fields. From milestones 28 to 24 much of the land is hilly and rough except for small patches that are mostly irrigated. Of course, the reason is that the water runs off the rocky hills and the wells are better.

Now the driver goes dangerously fast with many herds and flocks on the road returning to the villages for folding for the night.

We drive by the Maize and Millet Research Station, 7 miles west of Ajmer, as it becomes dark. This station is one aided by the Rockefeller Foundation. The Rabi crop is mostly small grain.

Ajmer is said to have about 2 lakhs population. The rainfall here is 22 inches and falls between July and October. As usual the streets are full of people.

We reach the Circuit House about 7:00 p.m. This is an old office building that has run down at the heels a bit. But it is said to have a pleasant view. Dinner is late. I take 2 sleeping pills for bed because of the racket. The boys have to fix up the place because the Governor and the Chief Secretary are coming tomorrow.

The soil continues about the same with more hills and overgrazed wasteland and more irrigated cereal, both at the expense of dryland fields. From milestones 28 to 24 much of the land is hilly and rough except for small patches that are mostly irrigated. Of course, the reason is that the water runs off the rocky hills and the wells are better.

Now the driver goes dangerously fast with many herds and flocks on the road returning to the villages for folding for the night.

We drive by the Maize and Millet Research Station, 7 miles west of Ajmer, as it becomes dark. This station is one aided by the Rockefeller Foundation. The Rabi crop is mostly small grain.

Ajmer is said to have about 2 lakhs population. The rainfall here is 22 inches and falls between July and October. As usual the streets are full of people.

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February 26

Tea at 6:30, pack, and breakfast at 7:00. A little before 8:00 we leave the Circuit House and go back west to visit the Maize and Millet Research Station of the State of Rajasthan. We see many bullocks carrying baskets of earth as well as donkeys.

At the Station there is in progress a 15-day camp for training farm leaders. This camp is sponsored by a private organization called Bharat Sevak Samaj. This is a society for rendering service. Sixty have enrolled for the camp and just now 40 are here. All are village leaders and, with 2 or 3 exceptions, each man represents one village.

The leader, who is a member of the legislature from Jethana village, and at least one other speak English but my guides insist on Hindi.

These farmers observe the use of tractors, which their cooperative societies may buy, and also study the seeding and fertilizer practices here. I am told that many farmers use too much seed as an outgrowth of their crude broadcasting practices. Most of these farmers have some irrigation from charas wells as well as rain-fed Kharif fields. Many say they have bunds or are making them during the off season.

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I try to get from them what they think are the most important opportunities for increasing the yields of food crops. It is always a bit hard to know how much is translation and how much is interpretation by my guides.

1. Conservation of rainfall, including tanks and bunds.

2. The gram sevaks have recently had more training and are now becoming helpful.

3. They need the use of tractors for leveling and bunding wasteland. The bullocks cannot do the first plowing of hard land. One speaks of the common land of his village which could be used if handled in this way. There are 30 acres of this land of little use now in a village of 90 families.

4. I take it they are only learning about contour bunds. Many want high field bunds partly to serve as fences.

5. Land consolidation is beginning in some villages but there are many handicaps. People are very attached to the land of their ancestors and some fields have been well cared for and improved. Families with these fields don't want to give them up.

6. They need loans for deeper wells and for tube wells. They are willing to pay for more equipment if they can only get it.

I take a picture of this group. (K-2782) One farmer has a camera and insists on my picture with them. Then they want me to give them a few words of advice so I talk a bit about combinations of good contour bunds, leveling, fertilizers, manure, and good seeds.

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K-2782. February 26, 1959. 7 miles west of Ajmer. Group of farm leaders in 15-day training school.

K-2783. February 26, 1959. 7 miles west of Ajmer. Wheat crop on Maize and Millet Research Station following maize. (D. K. Misra.)

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K-2783. February 26, 1959. 7 miles west of Ajmer. Wheat crop on Maize and Millet Research Station following maize. (D. K. Mars.)

February 26, 1959. Farm leaders at Research Station 7 miles west of Ajmer. (Photo by Satyanarayana)

February 26, 1959. Farm leaders at
Research Station 7 miles west of Ajmer.
(Photo by Satyanarayana)

Then I leave the farmers and walk over the Station with the manager, Mr. Mukut Bihari Bhargava. They now have 35 acres used for sorghum and maize in the Kharif season and wheat in the Rabi season. The best variety of wheat here is said to be 718 NP because it is early and escapes the rust. (K-2783) Second best is RS-31-1. The yields here with irrigation are about 20 to 35 maunds per acre. One plot gave 45 maunds. They use 20 "cartloads" of dung compost, 40 pounds of N, and 20 pounds of P_2O_5 as superphosphate per acre. The ammonium sulphate is split into two applications, one-half at seeding time and one-half with the second irrigation. They use partly sprinklers with portable pipe. They irrigate 4 or 5 times at intervals of 20 to 25 days. He says they use about 2 to 3 inches of water but no measurements of soil moisture are made and I don't think they really know. For the wheat they plow with a moldboard plow and disk once. I see seed-rate plots all the way from 50 pounds per acre to 120. The high rates give lodging. They recommend 80 pounds per acre, which I believe to be high with good seed and good seed beds.

We leave the Station at 9:10 and drive on further west along the road to Pali. I note here that the soils in the lowest places are saline.

Mr. Misra tells me that their first two attempts at contour bunding of village lands failed because the villagers would not follow the scheme. He says they have a good scheme now in the village

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of Jethana where we are going. He says that the block people have cooperated with them. Certainly contour bunding, if done correctly and maintained, could be very helpful here both for moisture conservation in the soil and for maintaining water levels in the wells.

At 16 miles we turn north about two miles and come to the village. (It is curious to see many of the children here under 5 years old wearing only a very short shirt or scarf.)

We stop and look a moment at the nice new building for the village panchayat (K-2787). For it the government furnished Rs 2,500 and the village Rs 5,500. They also have some nice medical and school buildings. Two of the farmers at the training school have come here to be with us, including the group leader who is a member of the legislature and belongs to this village. He tells me that the village sells oil seeds, especially sesame, jowar, bajra, wheat, other grains, sheep, goats, milk, a little ghee, chilies, and a little cotton. The village has a population of about 3,200 in about 550 families. All but 100 families own land but some landowners do other work also. Sixty families do leather work, now on a small scale, and an attempt is being made for government help for making this industry more efficient. Fifteen families make pottery; 4 are goldsmiths; 6 are blacksmiths; and 5 are carpenters. Some families work on other land and also make baskets. They have 10 cooperatives in the village: 4 are multiple purpose, 3 are industrial, 2 are for supplies, and one is for thrift.

We go out in the field and look at the bunds. Even though I am told that this is good work I think there is too much compromise

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K-2787. February 26, 1959. 17 miles west of Ajmer. New panchayat building with hospital in background.

K-2787. February 26, 1959. 17 miles west of Ajmer.
New panchayat building with hospital in background.

to get them as field bunds on the margins of the holdings. The work is organized through a village society. Some land owners have not joined and this results in bad gaps in the scheme. For this work the government gives 50 percent subsidy, excluding the time of the technicians. After a few initial demonstrations the subsidy will be reduced to 25 percent. This is a good soil with a sandy loam surface soil and a sandy clay B horizon that is relatively permeable. The bunds are 2½ to 3 feet high, about 6 feet wide at the base, and one foot wide on the top. (K-2784)

In one bunded field they are now raising a fair crop of gram as a Rabi crop for the first time. It will be harvested in two weeks. The villagers expect 800 pounds to the acre but I doubt that it will go quite that high. I think that it would be practicable to use a low bund former after plowing and before seeding on the contour to improve water penetration. They could also use some good resistant grass on these bunds to help hold them.

The soils without bunds are of good quality but can be used only for the Kharif crop (K-2785). This village has many small herds of grazing cattle, sheep, and goats tended mostly by children.

We drive on to another location where the work is a bit better (K-2786). There are a few outliers of hard quartzitic rock but most of the soil has about 1 to 2 percent slope. Out of 4,700 acres of arable land in the village only around 500 have been contour bunded. Some of the rest has field bunds. (K-2787) These are not recommended by the conservationist and no subsidy is given.

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We drive on to another location where the work is a bit better (K-278G). There are a few outliers of hard quartzitic rock but most of the soil has about 1 to 2 percent slope. Out of 4,700 acres of arable land in the village only around 500 have been contour bunded. Some of the rest has field bunds. (K-278T) These are not recommended by the conservationist and no subsidy is given.

K-2784. February 26, 1959. 17 miles west of Ajmer. New bunds approximately on contour in Jethana Village.

K-2785. February 26, 1959. 17 miles west of Ajmer. Unbunded soil of good quality in Jethana Village.

K-2786. February 26, 1959. 17 miles west of Ajmer.
New contour bunding in Jethana Village.

K-2788. February 26, 1959. 17 miles west of Ajmer.
Ordinary field bunding along roads and plot boundaries in Jethana Village.

K-2786. February 26, 1959. 17 miles west of Ajmer.
New contour bunding in Jethana Village.

K-2788. February 26, 1959. 17 miles west of Ajmer.
Ordinary field bunding along roads and plot
boundaries in Jethana Village.

One could scarcely find a better example of the great advantage of accurate contour bunding. If this were accompanied by land consolidation on the contour, the soils would then respond to other good practices, and I would wager that total production could be increased by at least three times, and probably more, not counting additional irrigation water from the better wells. I notice that they have a little irrigated land from charas wells.

About 11:00 a.m. we drive on into Ajmer and have lunch at the railway station. At 12:30 we start for Jaipur.

Leaving the city we pass through steeply sloping rocky hills with low bushes and trees except for bare very steep slopes. Then the irregular valley widens out into a gravelly and cobbly plain where only tiny low spots are used for irrigated cereals. Much of the plain here has a strong micro-relief from digging out gravel and perhaps some kankar. At 6 miles out we are on a broad plain used partly for Kharif crops, partly for rough grazing, and a little bit for irrigated wheat. I see a little gram and mixed gram and wheat. It may get just a little irrigation later. The plain has some hills and the dry stream beds are trenched about 10 feet. Much of the land is fallow after jowar and bajra, but the best fields have a Rabi crop of gram. The soils are a bit darker brown in color. I see many small flocks of goats and small herds of cattle, each tended by small children. I photograph the animals as they are brought up in groups for noon water (K-2789). At the same time the children have their own simple lunch.

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K-2789. February 26, 1959. 14 miles west of Ajmer. Watering the cattle, along with wheat irrigated from a charas well.

K-2789. February 26, 1959. 14 miles west of Ajmer. Watering the cattle, along with wheat irrigated from a dhara well.

We pass Kishangarh, a market town especially for oil crops and chilies, and with cotton mills.

At 19.5 miles from Ajmer we are over thin rolling soil with some low outcrops used for rough grazing.

All along this road one sees here and there ruins of old small fortresses, some of them used by the villagers.

Now again we are on an undulating plain with Kharif fields and fallow, some gram, and a little wheat irrigated from charas wells.

After the 25 milestone there is more cropland.

At a low place in the plain, the surface brown clay loam is underlain with a deep mass of lime and clay which is being dug out and made into rather poor sun-dried bricks for village houses. Along here are many low rocky places, which are limy, a bit salty, dissected by small gullies, and terribly overgrazed. Beyond, there are some small fields of irrigated wheat. Most of it is late and nitrogen deficient.

I stop to look at a charas well. The water is pulled up in a large leather bag with a leather funnel. There are 2 ropes, one attached to the top of the bag and the other to the end of the long funnel. As the bag is pulled up by the bullocks the main weight is carried by the rope on the main bag but the other rope is tight and keeps the funnel higher than the water in the bag. When the bag is up at full height the rope attached to the funnel pulls it over to the tank and the water flows through it into the tank from the bag. This is called the "automatic opening type of charas."

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From 41 miles west of Jaipur to 39.5 I see fairly good wheat. Then I see few fields or people although the soil looks all right to me. Probably this is an old holding being taken over. There are several flocks and some dryland fields.

Thirty-six miles west of Jaipur I stop to look at the village of Gadaini (K-2790). They have a charas well to get water for a little irrigation and for their many animals. (K-2791) They have stacks of jowar fodder and this along with bajra, gram, and wheat are their principle crops. They complain that they are short of water but they have so many cattle and goats. I walk through the village a little. Certainly it is a poor village. I see no doors in the homes, only doorways (K-2792). Most houses have near them a little corral for the animals with fences about shoulder high made of spiny bushes. (K-2793; K-2794)

We continue on. At milepost 27 from Jaipur the soil is better and I see much land used for Kharif crops, but apparently the water table is too deep for wells for irrigation. It is too bad that they don't have tube wells for these good soils, because in the lowlands where they can reach water the soils are heavy and limy. In fact, some of these low areas are really Solonchak.

After we pass milestone 23 onto a bit higher plain the soil is better for crops and I see irrigated wheat and barley.

As we drive on east the trees are bigger and I see some palms but the field patterns are quite irregular. The population is denser. I see many sheep on rough pasture and Kharif stubble. The soil is a bit sandier and there are a few low stabilized dunes. (K-2795; K-2796)

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K-2790. February 26, 1959. 36 miles west of Jaipur.
View in Gadaini Village.

K-2791. February 26, 1959. 36 miles west of Jaipur.
View at Gadaini village well.

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View in Gadaini Village.

K-2791. February 26, 1959. 36 miles west of Jaipur.
View at Gadaini village well.

K-2792. February 26, 1959. 36 miles west of Jaipur. View of family courtyard through doorway in Gadaini village.

K-2793. February 26, 1959. 36 miles west of Jaipur. Another view in Gadaini village.

K-2792. February 26, 1959. 36 miles west of Jaipur.
View of family courtyard through doorway in
Gadaini village.

K-2793. February 26, 1959. 36 miles west of Jaipur.
Another view in Gadaini village.

K-2794. February 26, 1959. 36 miles west of Jaipur.
Cow and calf in corral in Gadaini village.

K-274. February 26, 1959. 36 miles west of Jaipur.
Cow and calf in corral in Gadaini village.

K-2795. February 26, 1959. 21 miles west of Jaipur. Bajra stacks and growing gram. In the distance a well and irrigated wheat or barley.

K-2796. February 26, 1959. 11 miles west of Jaipur. A farm. Note the brush-covered bunds mainly for control of soil blowing and for fencing. There is a bit of wheat, some vegetables, and the usual Kharif fields.

K-2795. February 26, 1959. 21 miles west of Jaipur. Bajra stacks and growing gram. In the distance a well and irrigated wheat or barley.

K-2796. February 26, 1959. 11 miles west of Jaipur. A farm. Note the brush-covered bunds mainly for control of soil blowing and for fencing. There is a bit of wheat, some vegetables, and the usual Kharif fields.

Most of these have brush-covered high bunds for protection against soil blowing and for fences. They have the usual bajra and jowar fields and a bit of irrigated wheat and some vegetables. Here and there one sees castor beans and chilies.

As we drive on we pass a large herd of camels. (K-2997) I am again impressed with the advantage they have of being able to browse high branches. I am told these camels are worth about Rs 400 to 800 before training.

Some of the farmers here grow a tall grass, Saccharum sarc (munja) on the bunds. (K-2998) This gives a high windbreak and protects them from the rain, which is quite important on this sandy soil. When mature these small canes are harvested for thatch and for making mats and even furniture, such as chair seats.

We reach Rambagh Palace (hotel) at 4:45 p.m.

I bathe and try to shave but my electric razor has gone bad and I have to fall back on the old straight edge. While still in my underwear two gentlemen walk in and insist on a conference. So we confer while I complete my dressing. They are the Director of Animal Husbandry in Rajasthan, Mr. B. N. Handa, and his Deputy, Mr. Mathur. I register as much impatience as I can without discourtesy but they stay for about an hour that I so much wanted to use for something else. They feel that the animal population in the State is far too high but many people, especially the city people and politicians, are opposed to alaughter. I discuss with them some points in the recent formal review of the work under the Union Ministry of Community Development and Cooperation. (New Delhi, 27 January 1959.)

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As we drive on we pass a large herd of camels. (K-2497) I am again impressed with the advantage they have of being able to browse high branches. I am told these camels are worth about Rs 400 to 800 before training.

Some of the farmers here grow a tall grass, Saccharum sara (munja) on the bunds. (K-2798) This gives a high windbreak and protects them from the rain, which is quite important on this sandy soil. When mature these small canes are harvested for thatch and for making mats and even furniture, such as chair seats.

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K-2797. February 26, 1959. 9 miles west of Jaipur. Small part of herd of camels.

K-2798. February 26, 1959. 7 miles west of Jaipur. Both bunds on this roadway have a cover of Saccharum sarc (munja).

They give me the following figures for animal population:

Cattle	11,200,000	Donkeys	200,000
Buffalo	3,400,000	Horses	100,000
Sheep	7,300,000	Swine	100,000
Goats	8,700,000	Chickens	450,000
Camels	400,000		

They tell me that they would have good possibilities for poultry and the government has a scheme for furnishing good chicks. But it is hard to get the cultivators to care for them properly and many are opposed to the slaughter of chickens.

There are at present 172 goshals in the State (these are the homes for useless old cows). In connection with some of these there is an additional improved herd for supplying good bulls. I'm not sure how well this works since the males are castrated to become bullocks from 14 to 18 months old.

Finally these gentlemen leave about 6:30. I work on my notes, have dinner, work awhile, and go to bed.

They give me the following figures for animal population:

Cattle	11,200,000	Donkeys	200,000
Buffalo	3,400,000	Horses	100,000
Sheep	7,300,000	Swine	100,000
Goats	8,700,000	Chickens	450,000
Camels	400,000		

They tell me that they would have good possibilities for poultry and the government has a scheme for furnishing good chicks. But it is hard to get the cultivators to care for them properly and many are opposed to the slaughter of chickens.

There are at present 172 goshals in the State (these are the homes for useless old cows). In connection with some of these there is an additional improved herd for supplying good bulls. I'm not sure how well this works since the males are castrated to become bullocks from 14 to 18 months old.

Finally these gentlemen leave about 6:30. I work on my notes, have dinner, work awhile, and go to bed.